

TOSHIBA

SERVICE MANUAL

COLOUR TELEVISION

21S23N

SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.

Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a  mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.

Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.

Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal [Note 2] should be more than 1M ohm by using the 500V insulation resistance meter [Note 1].
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal
Earphone jack

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER

The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.

2. PART NO. and DESCRIPTION

You can find it in your SERVICE MANUAL.

IMPORTANT

Inferior silicon grease can damage IC's and transistors.

When replacing an IC's or transistors, use only specified silicon grease (YG6260M).

Remove all old silicon before applying new silicon.

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GENERAL SPECIFICATIONS

G-1	TV System	CRT	CRT Size / Visual Size	21 inch / 544.5mmV
		CRT Type	NORMAL	
		Deflection	90 degree	
		Magnetic Field	BV/BH	+0.45G/0.18G
		Color System	PAL/SECAM	
		Speaker	2 Speaker	
		Position	Front	
		Size	2.0 x4.7 Inch	
		Impedance	4 ohm	
		Sound Output	MAX	5.0+5.0 W
			10%(Typical)	4.0+4.0 W
		DDR SECAM	Yes	
		NTSC3.58(AV)+NTSC4.43	Yes	
		PAL60Hz	Yes	
G-2	Tuning System	Broadcasting System	CCIR System	B/G
		Tuner and Receive CH	System	1Tuner
			Destination	Hyper
			Tuning System	F-Synth
			Input Impedance	VHF/UHF 75 ohm
			CH Coverage	E2 - E4, X - Z+2, S1 - S10, E5 - E12, S11 - S41, E21 - E69
		Intermediate Frequency	Picture(FP) Sound(FS) FP-FS	38.9 MHz 33.4 MHz 5.5MHz
		Preset CH	100	
		Stereo/Dual TV Sound	Yes	
		Tuner Sound Muting	Yes	
G-3	Power	Power Source	AC DC	230V AC 50Hz
		Power Consumption	at AC	60 W at AC 230 V 50 Hz 3 W at AC 230 V 50 Hz -- kWh/Year
			Stand by (at AC)	
			Per Year	
G-4	Regulation	Protector	Power Fuse	Yes
		Safety	CE(EN60065:98)	
		Radiation	CE	
G-5	Temperature	X-Radiation	-	
		Operation	+5oC ~ +40oC	
G-6	Operating Humidity	Storage	-20oC ~ +60oC	
			Less than 80% RH	

GENERAL SPECIFICATIONS

G-7	On Screen Display	Menu		
		Menu Type	Yes Character	
		Picture	Yes	
		Contrast	Yes	
		Brightness	Yes	
		Color	Yes	
		Tint (NTSC Only)	Yes	
		Sharpness	Yes	
		Audio	Yes	
		Bass	Yes	
		Treble	Yes	
		Balance	Yes	
		BBE On/Off	No	
		Stable Sound On/Off	No	
		CH Tuning	Yes	
		Manual	Yes	
		Auto	Yes	
		CH Allocation	Yes	
		Language	Yes	
		Clock Set	No	
		On Timer Set	Yes	
		Off Timer Set	Yes	
		Pin Code Registration	No	
		Panel Lock	Yes	
		Nicam Auto Off	Yes	
		AV Color System	Yes	
		Sound System	No	
		Auto 4:3 Default	No	
		AV2 Output	Yes	
		Output Source	Yes	
		Source	Yes	
		Control Level	Yes	
		Volume	Yes	
		Brightness	Yes	
		Contrast	Yes	
		Color	Yes	
		Tint (NTSC Only)	Yes	
		Sharpness	Yes	
		Tuning	Yes	
		Bass	Yes	
		Treble	Yes	
		Balance	Yes	
		Back Light	No	
		Nicam ST	Yes	
		G(A2)Stereo	Yes	
		Tone 1/2 (A/B)	Yes	
		Surround On/Off	No	
		Pin Code	No	
		AV	Yes	
		Skip	Yes	
		Channel	Yes	
		Hotel Lock	No	
		Sleep Timer	No	
		Selectable Picture	Yes	
		Wide Mode	No	
		Sound Mute	Yes	
G-8	OSD Language		English French Spanish German Italian Greek Turkish Swedish Dutch Portuguese Norwegian Finnish Danish	
G-9	Clock and Timer	Sleep Timer	Max Time Step	- Min - Min
		Clock		No
		On Timer	Program(On Timer)	Yes
		Off Timer	Program(Off Timer)	Yes
		Wake Up Timer		No
		Timer Back-up (at Power Off Mode)	more than	-- Min Sec

GENERAL SPECIFICATIONS

G-10	Remote Control	Unit	RC-EY
		Glow in Dark Remocon	No
		Format	NEC
		Custom Code	40-BF_h
		Power Source	Voltage(D.C) UM size x pcs
		Total Keys	3V UM-4 x 2 pcs 33 Keys
		Keys	Power 1 2 3 4 5 6 7 8 9 0 Volume Up / + Volume Down / - Previous Select Picture Menu OK(Enter) EXIT Audio Select Sleep Timer Mute
		TTEXT Keys	TEXT / MIX / TV CH Up / Page Up CH Down / Page Down Red Green Yellow Cyan TEXT F/T/B Reveal TIMED PAGE(SUB PAGE) CALL / TEXT INDEX INPUT SELECT TEXT HOLD TIME / TXCL

GENERAL SPECIFICATIONS

G-11	Features	Auto Degauss	Yes
		Auto Shut Off	Yes
		Canal+	No
		CATV	No
		Anti-theft(Back Up 30 Min.)	No
		Memory(Last CH)	Yes
		Memory(Last Volume)	Yes
		BBE	No
		Auto Search	Yes
		CH Allocation	Yes
		Just Clock Function	No
		Game Position	No
		CH Label	No
		VM Circuit	No
		Full OSD	No
		Unitext	No
		Fastext	Yes
		Top Text	Yes
		Premiere	No
		Comb Filter	No
		<u>Lines</u>	
		Auto CH Memory	Yes
		Stable Sound	No
		Auto Set Up	No
		FBT Leak Test Protect	Yes
		Previous (Quick View)	Yes
		Panel Lock	Yes
		Power On Memory	Yes
		Double Focus & Dynamic Focus	No
		Wss Signal Wide Change	No
		Virtual Dolby Surround	No
		Hotel Lock	No
G-12	Accessories	Owner's Manual	English, Spanish, Portgal, Swedish, Norwegian
		w/Guarantee Card	No
		Remote Control Unit	Yes
		Rod Antenna	No
		Poles	Pole
		Terminal	type
		Loop Antenna	No
		Terminal	-
		U/V Mixer	No
		DC Car Cord (Center+)	No
		Guarantee Card	No
		Warning Sheet	No
		Circuit Diagram	No
		Antenna Change Plug	No
		Service Facility List	No
		Important Safeguard	Yes (Owner's Manual In)
		Dew/AHC Caution Sheet	No
		AC Plug Adapter	No
		Quick Set-up Sheet	Yes
		Battery	Yes
		UM size x pcs	UM-4 x 2 pcs
		OEM Brand	No
		AC Cord	No
		AV Cord (2Pin-1Pin)	No
		Registration Card	No
		PTB Sheet	No
		300 ohm to 75 ohm Antenna Adapter	No

GENERAL SPECIFICATIONS

G-13	Interface	Switch	Front	Power (Tact Sw)	No
				System Select	No
				Main Power SW	Yes
				Sub Power	No
				Channel Up	Yes
				Channel Down	Yes
				Volume Up	Yes
				Volume Down	Yes
		Rear	AC/DC		No
			TV/CATV Selector		No
			Degauss		No
			Main Power SW		No
	Indicator		Power		No
			Stand-by		No
			Stand-by/ON		Yes(Red)
			On Timer		Yes(Green)
	Terminals	Front	Video Input		RCA
			Audio Input		RCA x2
			Other Terminal		Head Phone (Stereo)
		Rear	Video Input(Rear1)		No
			Video Input(Rear2)		No
			Audio Input(Rear1)		No
			Audio Input(Rear2)		No
			Video Output		No
			Audio Output		No
			Euro Scart(21Pin)		Yes (x1)
			S-INPUT		Yes (x1)
			Euro Scart(21Pin)		Yes (x1)
			RGB-INPUT		Yes (x1)
			Component Input		No
			Diversity		No
			Ext Speaker		No
			DC Jack 12V(Center +)		No
			VHF/UHF Antenna Input		D Type
			AC Outlet		No
G-14	Set Size		Approx.	W x D x H (mm)	590 x 492 x 446.5
G-15	Weight		Net (Approx.)		21.0 kg (--- lbs)
			Gross (Approx.)		23.8kg (---lbs)
G-16	Carton	Master Carton			No
			Content	---	Sets
			Material	--	/--
			Dimensions W x D x H(mm)	-- X --	X --
		Gift Box	Description of Origin	---	
				Yes	
			Material		Double/Brown
	Drop Test	Gift Box	Dimensions W x D x H(mm)	658 x 575 x 529	
			Design		As per Buyer's
			Description of Origin		No
					Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
			Height (cm)	46	
			Container Stuffing	288	Sets/40' container
G-17	Cabinet Material		Cabinet Front		PS 94HB
			Cabinet Rear		PS 94HB
			Holder		PS 94V0 NC

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

- * After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
- * Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. (**Refer to Fig. 1-1.**)

Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground. While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.

A cracking noise will be heard as the voltage is discharged.

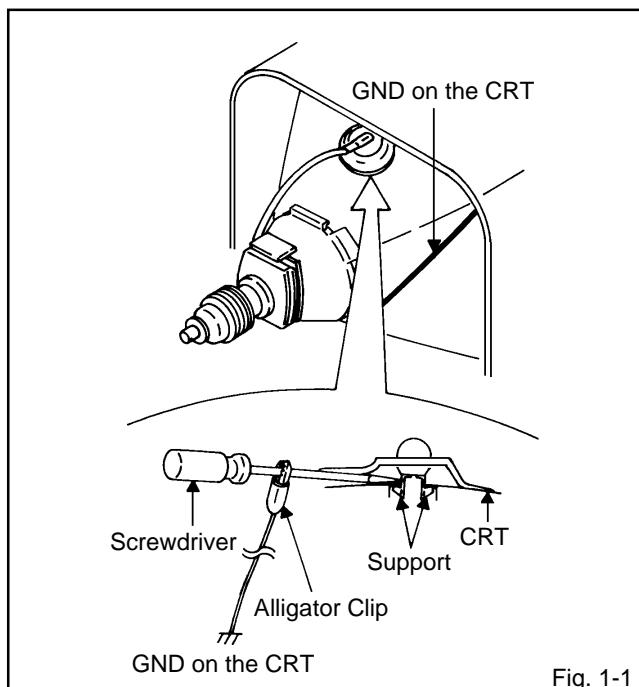


Fig. 1-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support.

(**Refer to Fig. 1-2.**)

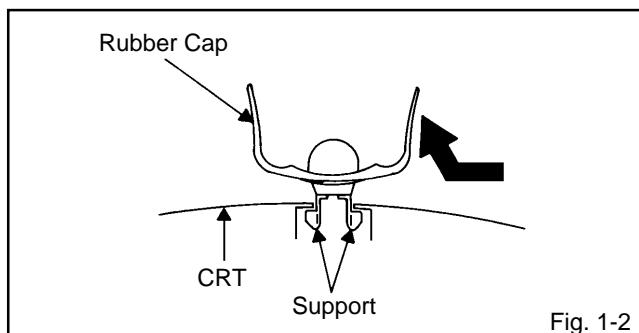


Fig. 1-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. (**Refer to Fig. 1-3.**)

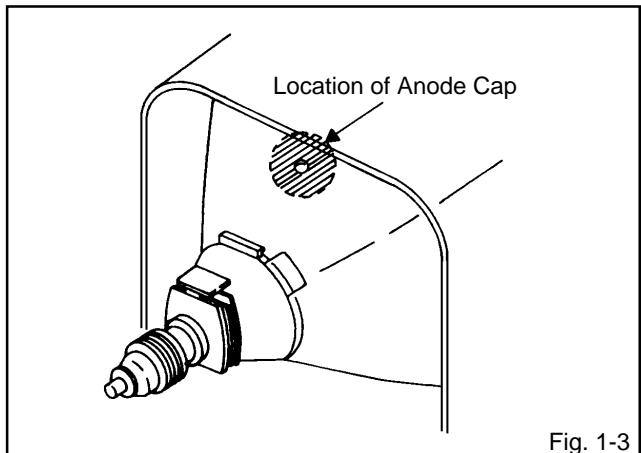


Fig. 1-3

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. (**Refer to Fig. 1-4.**)

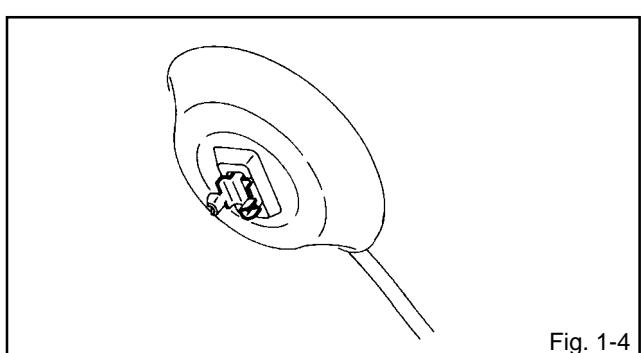


Fig. 1-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 1-5.**

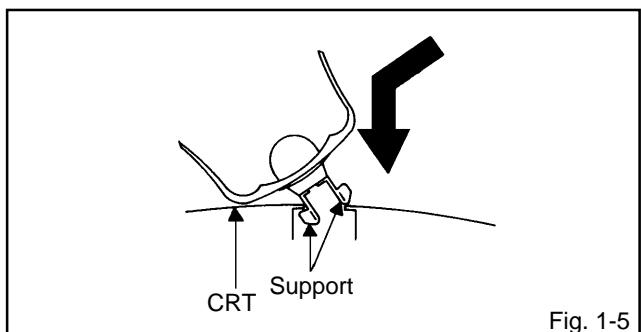


Fig. 1-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

DISASSEMBLY INSTRUCTIONS

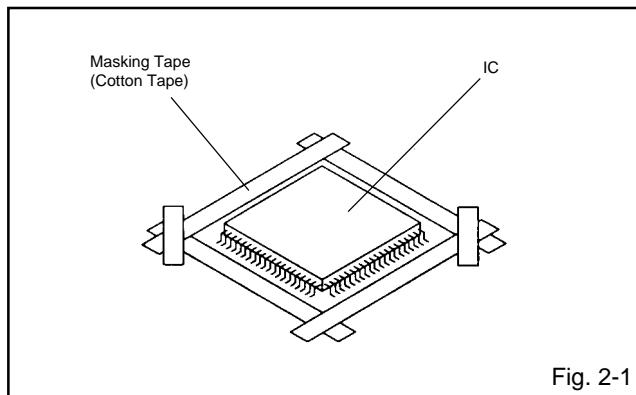
2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. (Refer to Fig. 2-1.)

NOTE

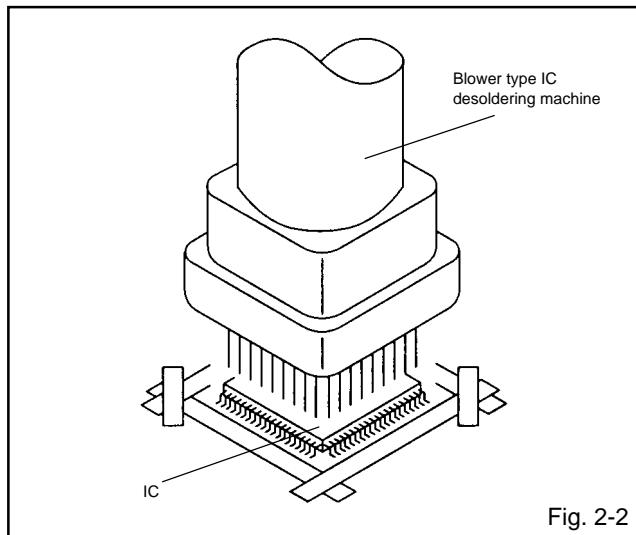
Masking is carried out on all the parts located within 10 mm distance from IC leads.



2. Heat the IC leads using a blower type IC desoldering machine. (Refer to Fig. 2-2.)

NOTE

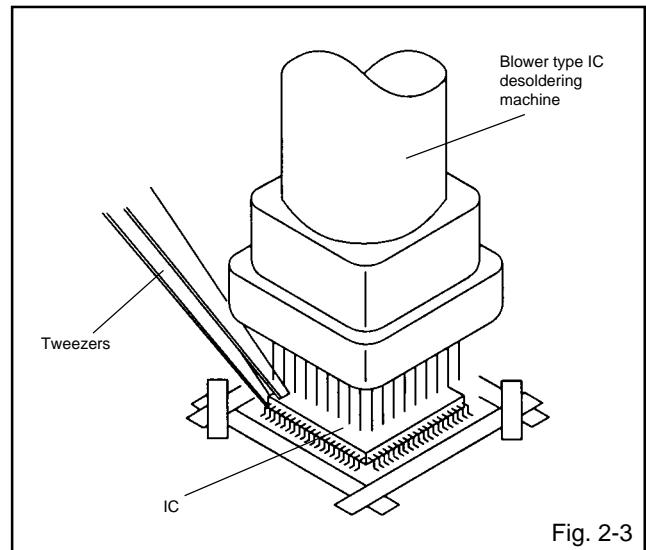
Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.



3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. (Refer to Fig. 2-3.)

NOTE

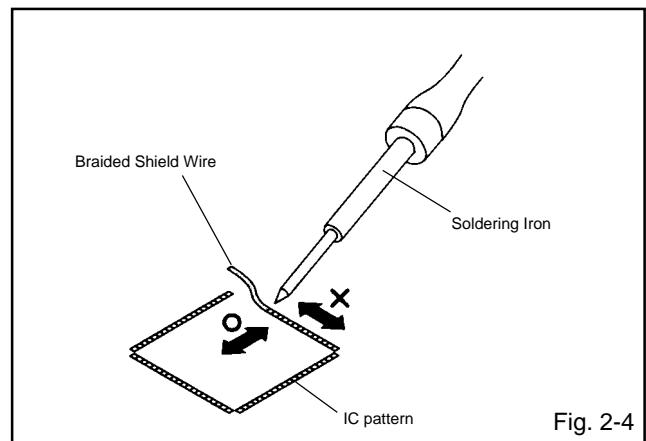
Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.



4. Peel off the Masking Tape.
5. Absorb the solder left on the pattern using the Braided Shield Wire. (Refer to Fig. 2-4.)

NOTE

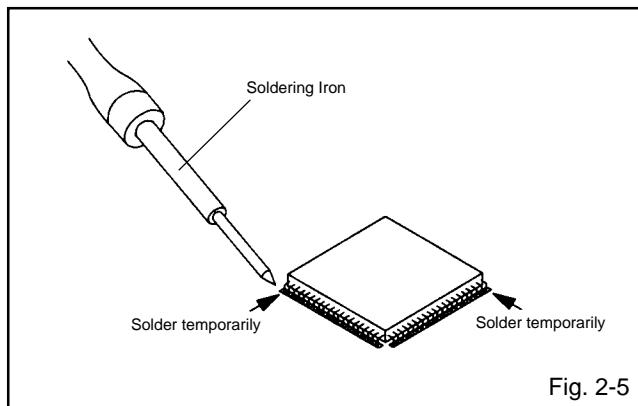
Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.



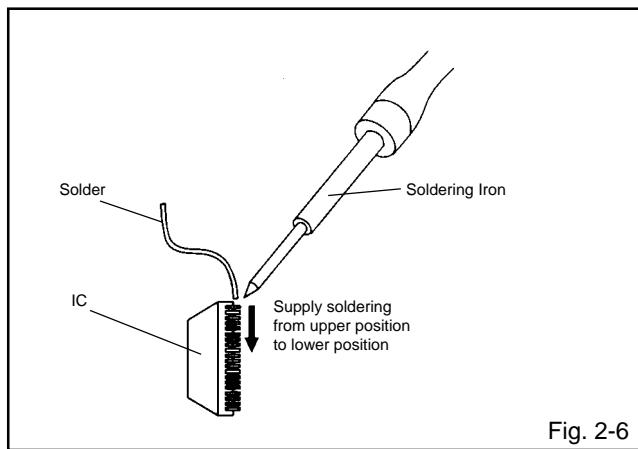
DISASSEMBLY INSTRUCTIONS

INSTALLATION

- Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 2-5.)**



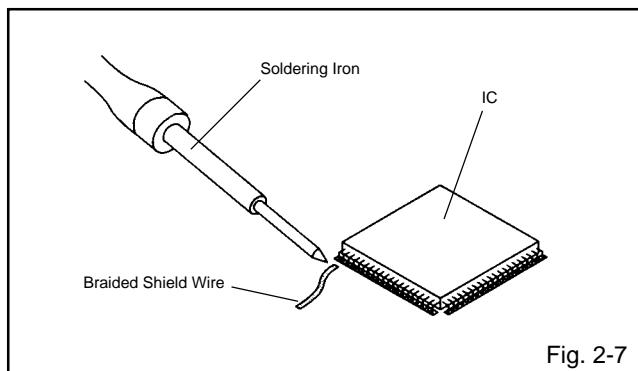
- Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 2-6.)**



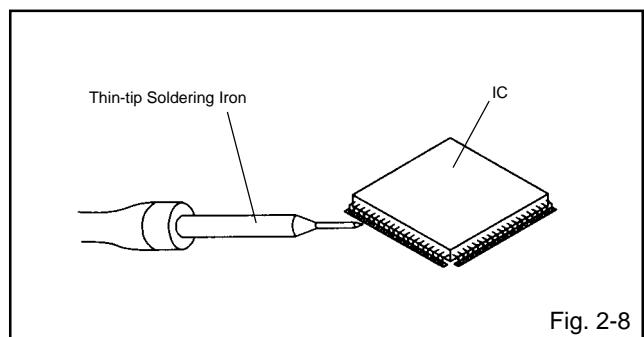
- Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 2-7.)**

NOTE

Do not absorb the solder to excess.



- When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 2-8.)**



- Finally, confirm the soldering status on four sides of the IC using a magnifying glass. Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

NOTE

When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 2 seconds.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Reset the user setting items (PICTURE, VOLUME, LANGUAGE and NICAM AUTO/OFF) to the initial state for delivery.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours.
VOL. (-) MIN	6	POWER ON total hours is displayed on the screen. Refer to the "CONFIRMATION OF HOURS USED". Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

NOTE: If you set a factory initialization, the total hours is reset to "0".

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 2 seconds.
3. After the confirmation of using hours, turn off the power.

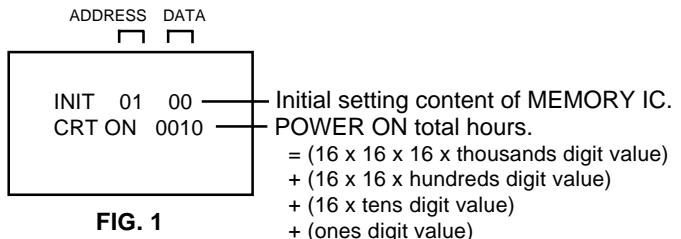


FIG. 1

WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	---	00	38	23	18	71	80	48	00	47	33	05	03	00	06	73
10	10	00	80	80	80	3C	00	BA	06	9F	33	80	00	02	1A	25
20	53	26	2D	6D	C0	00	44	20	0A	00	18	1E	00	DF	CA	05
30	00	95	A7	7F	07	00	40	00	00	00	00	00	00	00	00	00
40	0F	23	27	2B	2F	33	37	3B	3F	40	41	42	43	44	45	46
50	47	48	49	4A	4B	4C	4D	4E	4F	50	51	51	52	52	53	53
60	54	54	55	55	56	56	57	57	58	58	59	59	5A	5A	5B	5B
70	5C	5C	5D	5D	5E	5E	5F	5F	60	60	61	61	62	63	64	65
80	22	25	CD	CF	D3	D8	94	97	99	52	54	56	57	59	5B	5D
90	5E	5F	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button (6) on the remote control for more than 2 seconds. ADDRESS and DATA should appear as FIG 1.

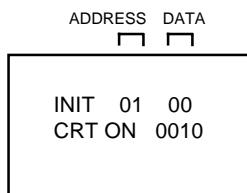


Fig. 1

3. ADDRESS is now selected and should "blink". Using the VOL. +/- button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press OK to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. +/- button until required DATA value has been selected.
6. Pressing OK will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input.

After the data input, set to the initializing of shipping.

9. Turn POWER on.
10. Press both VOL. DOWN button on the set and Channel button (1) on the remote control for more than 2 seconds.
11. After the finishing of the initializing of shipping, the unit will turn off automatically.

The unit will now have the correct DATA for the new MEMORY IC.

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor).

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button (9) on the remote control for more than 2 seconds to appear the adjustment mode on the screen as shown in Fig. 1-1.

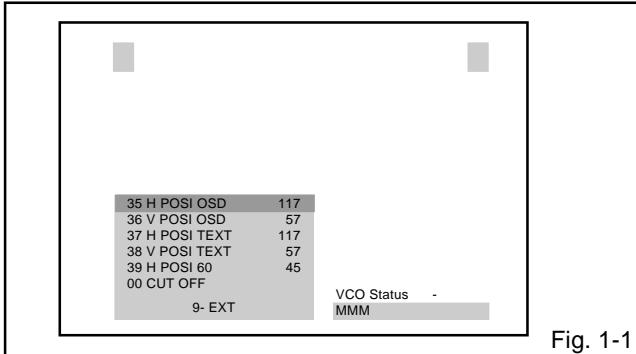


Fig. 1-1

2. Use the Channel button (0-9) or Channel UP/DOWN button on the remote control to select the options shown in Fig. 1-2.
3. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
00	CUT OFF	20	TINT
01	RF AGC	21	SHARP
02	AGC GAIN	22	CONTRAST CENT
03	R DRIVE	23	CONTRAST MAX
04	R CUTOFF	24	CONTRAST MIN
05	G DRIVE	25	COLOR CENT
06	G CUTOFF	26	COLOR MAX
07	B DRIVE	27	COLOR MIN
08	H POSI (50)	28	M R CUT OFF
09	V POSI (50)	29	M G CUT OFF
10	V POSI (60)	30	M B CUT OFF
11	V SIZE (50)	31	CVBS OUT
12	V SIZE (60)	32	APR THRESHOLD
13	VCO COARSE	33	BELL FILTER
14	VCO FINE	34	BANDPASS
15	VCO COARSE L1	35	H POSI OSD
16	VCO FINE L1	36	V POSI OSD
17	BRIGHT CENT	37	H POSI TEXT
18	BRIGHT MAX	38	V POSI TEXT
19	BRIGHT MIN	39	H POSI (60)

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Place the set with Aging Test for more than 5 minutes.
2. Connect the digital voltmeter to **TP501**.
3. Set condition is AV MODE without signal.
4. Adjust the **VR501** until the DC voltage is $115 \pm 0.5V$.

2-2: VCO

1. Place the set with Aging Test for more than 10 minutes.
2. Connect the oscillator (38.9MHz) to **TP001**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "VCO COARSE".
4. Press the VOL. +/- button on the remote control until the "OK" appear on the screen. If the "OK" is not displayed, select the "+" side on the changed from "+" to "-".
5. Press the Page UP button once to set to "VCO FINE" mode.
6. Press the VOL. +/- button on the remote control to select the 5 step down point from the upper limit on the "OK".
(Example: In case of the "OK" range 30~41, select 36.)

2-3: AGC VOLTAGE

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the VHF HIGH (63dB).
3. Connect the digital voltmeter to **pin 5 of CP101**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "RF AGC".
5. Press the VOL. +/- button on the remote control until the digital voltmeter is $2.50 \pm 0.05V$.

2-4: CUT OFF

1. Set condition is AV MODE without signal.
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set with Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(00)** on the remote control to select "CUT OFF".
5. Adjust the **Screen Volume** until a dim raster is obtained.

2-5: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(03)** on the remote control to select "R DRIVE".
5. Press the Page UP/DOWN button on the remote control to select the "R DRIVE", "G DRIVE", "M R CUT OFF" or "M G CUTOFF".
6. Adjust the VOL. +/- button on the remote control to whiten the R DRIVE, G DRIVE, M R CUT OFF, and M G CUT OFF at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

ELECTRICAL ADJUSTMENTS

2-6: FOCUS

1. Receive a 70dB monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-7: HORIZONTAL POSITION

1. Receive the monoscope pattern from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(08)** on the remote control to select "H POSI (50)".
4. Press the VOL. +/- button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.
5. Receive the monoscope pattern of NTSC. (Audio Video Input)
6. Set to the AV mode.
7. Using the remote control, set the brightness and contrast to normal position.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(39)** on the remote control to select "H POSI (60)".
9. Press the VOL. +/- button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-8: VERTICAL POSITION/VERTICAL LINEARITY

1. Receive the monoscope pattern from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Adjust the **VR401** until the horizontal line becomes fit to the notch of the shadow mask.
4. Adjust the **VR420** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-9: VERTICAL SIZE

1. Receive the monoscope pattern from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(11)** on the remote control to select "V SIZE (50)".
4. Press the VOL. +/- button on the remote control adjust the V.SIZE becomes $8 \pm 2\%$.
5. Receive a broadcast and check if the picture is normal.
6. Receive the monoscope pattern of NTSC. (Audio Video Input)
7. Set to the AV mode.
8. Using the remote control, set the brightness and contrast to normal position.
9. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(12)** on the remote control to select "V SIZE (60)".
10. Press the VOL. +/- button on the remote control adjust the V.SIZE becomes $10 \pm 2\%$.
11. Receive a broadcast and check if the picture is normal.

2-10: BRIGHT CENT

1. Receive the PAL black pattern*. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set with Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select "BRIGHT CENT".
5. Press the VOL. +/- button on the remote control until the screen begin to shine.
6. Receive the PAL black pattern*. (Audio Video Input)
7. Set to the AV mode. Then perform the above adjustments 2~5.

*The Black Pattern means the whole black raster signal.
Select the "RASTER" of the pattern generator, set to the OFF position for each R, G and B.

2-11: CONTRAST CENT

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "CONTRAST CENT".
2. Press the VOL. +/- button on the remote control until the contrast step No. becomes "35".
3. Receive a broadcast and check if the picture is normal.
4. Set to the AV mode. Then perform the above adjustment 1~3.

2-12: COLOR CENT

1. Receive the PAL color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast and color to normal position.
3. Connect the oscilloscope to **TP801**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(25)** on the remote control to select "COLOR CENT".
5. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 5 scales on the screen of the oscilloscope.
6. Press the VOL. +/- button on the remote control until the red color level is adjusted to $90 \pm 10\%$ of the white level. (**Refer to Fig. 2-1**)
7. Receive the PAL color bar pattern. (Audio Video Input)
8. Set to the AV mode. Then perform the above adjustments 2~6.

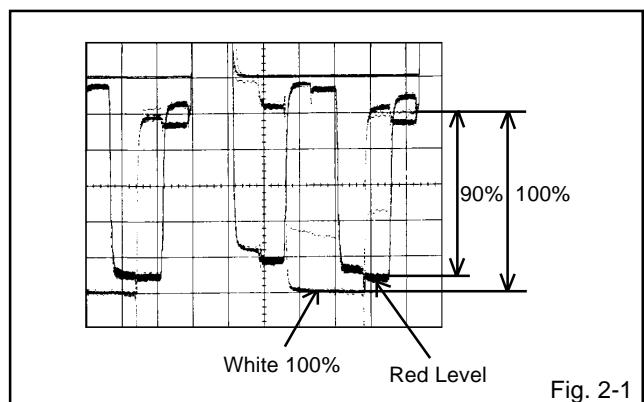


Fig. 2-1

ELECTRICAL ADJUSTMENTS

2-13: TINT

1. Receive the NTSC color bar pattern. (Audio Video Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Connect the oscilloscope to **TP803**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(20)** on the remote control to select "TINT".
5. Press the VOL. +/- button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-2)**

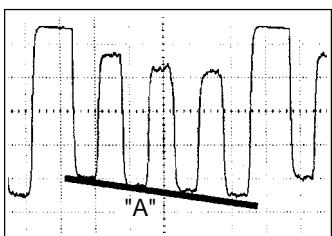


Fig. 2-2

2-14: HORIZONTAL POSITION TEXT

1. Using the remote control, set the brightness and contrast to normal position.
2. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(37)** on the remote control to select "H POSI TEXT".
3. Press the TEXT/MIN/TV button on the remote control.
4. Press the VOL. +/- button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-3)**

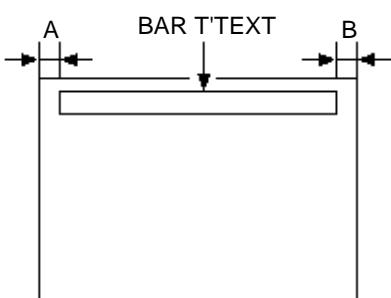


Fig. 2-3

2-15: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below.

NO.	FUNCTION	RF	AV
02	AGC GAIN	00	---
04	R CUTOFF	00	---
06	G CUTOFF	00	---
07	B DRIVE	45	---
09	V POSI (50)	05	---
10	V POSI (60)	00	---
18	BRIGHT MAX	25	25
19	BRIGHT MIN	16	16
20	TINT	30	ADJ.
21	SHARP	02	02
23	CONTRAST MAX	50	50
24	CONTRAST MIN	10	10
26	COLOR MAX	50	50
27	COLOR MIN	10	10
30	M B CUT OFF	127	---
31	CVBS OUT	31	---
32	APR THRESHOLD	00	---
33	BELL FILTER	15	---
34	BANDPASS	00	---
35	H POSI OSD	135	---
36	V POSI OSD	57	---
38	V POSI TEXT	57	---

*To check for the fixed values of the RF (60Hz), indicate the adjustment mode screen while input the 60Hz video signal.

ELECTRICAL ADJUSTMENTS

3. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. (**Refer to Fig. 3-1**)
If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

3-2: PURITY

NOTE

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue colors.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

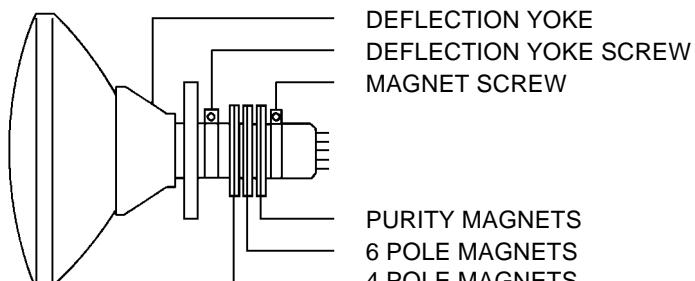


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

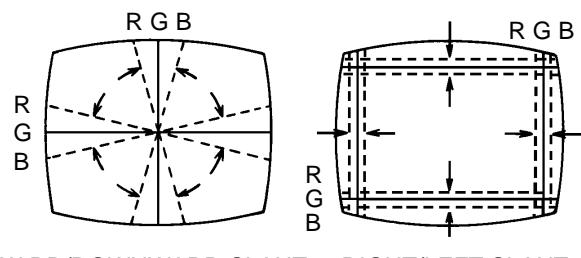
1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

3-4: DYNAMIC CONVERGENCE

NOTE

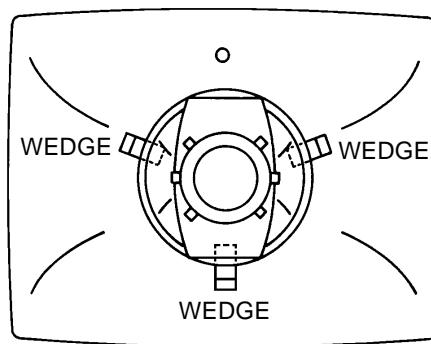
Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. (**Refer to Fig. 3-2-a**)
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. (**Refer to Fig. 3-2-b**)



UPWARD/DOWNWARD SLANT RIGHT/LEFT SLANT

Fig. 3-2-a

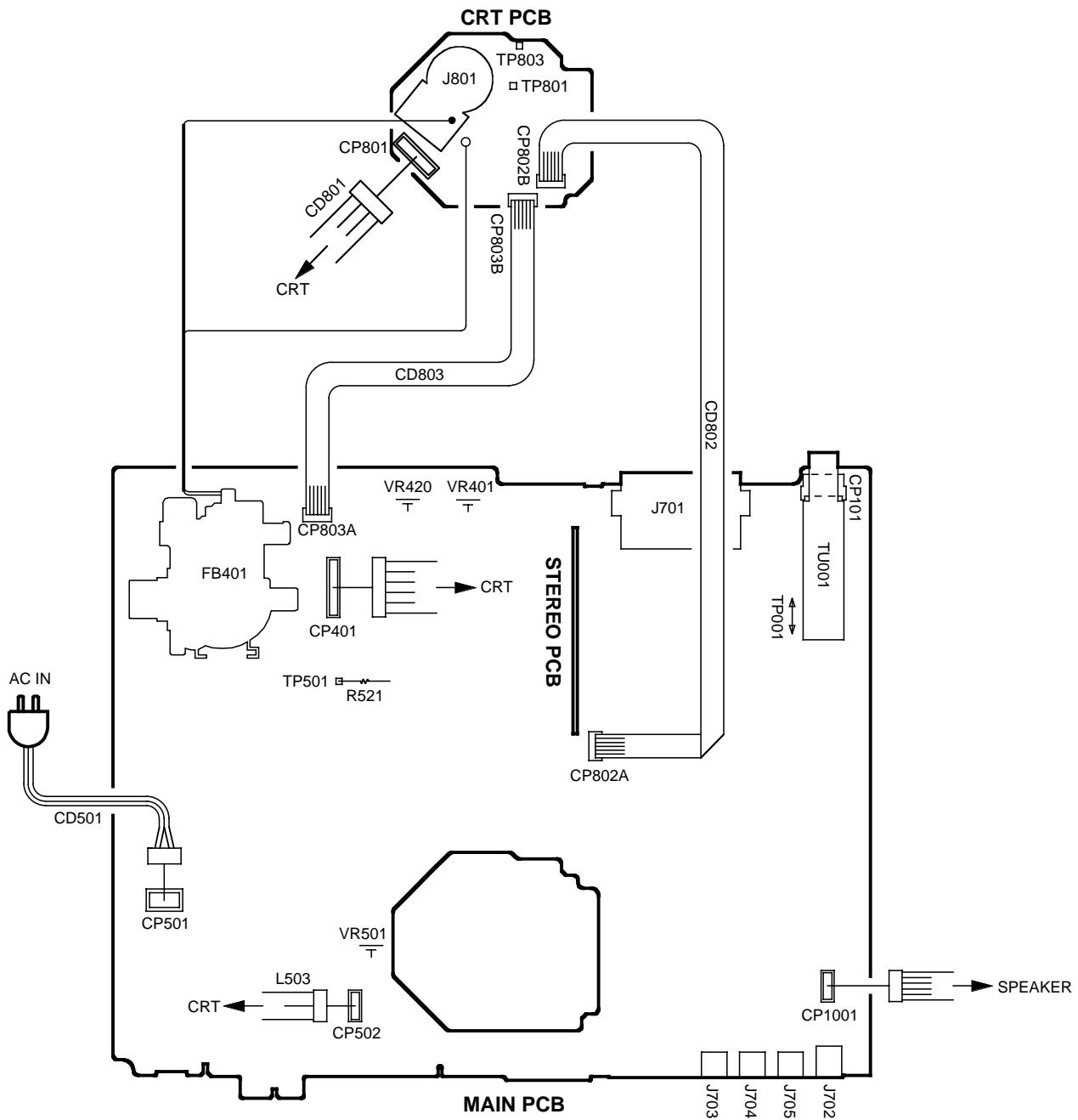


WEDGE POSITION

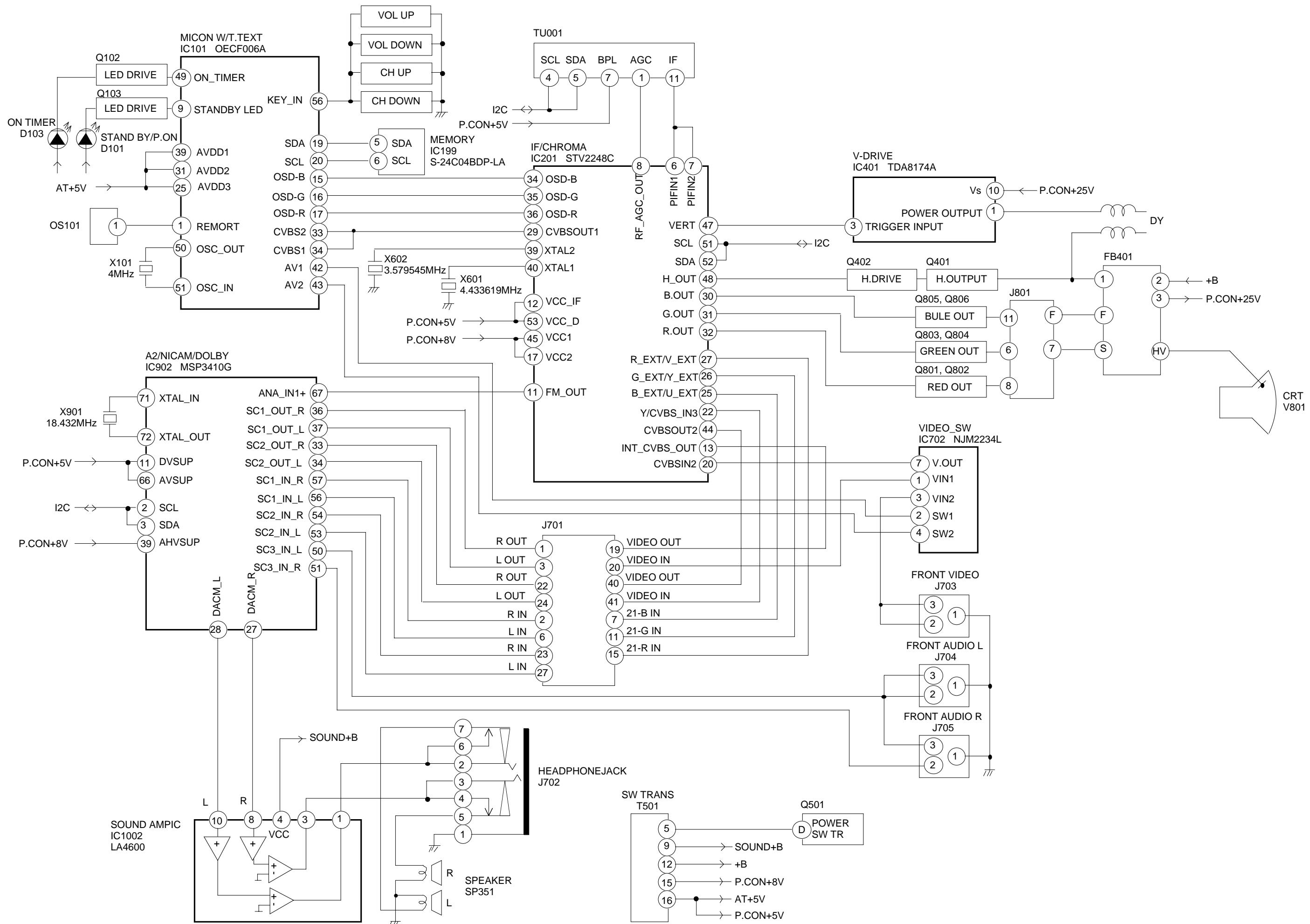
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

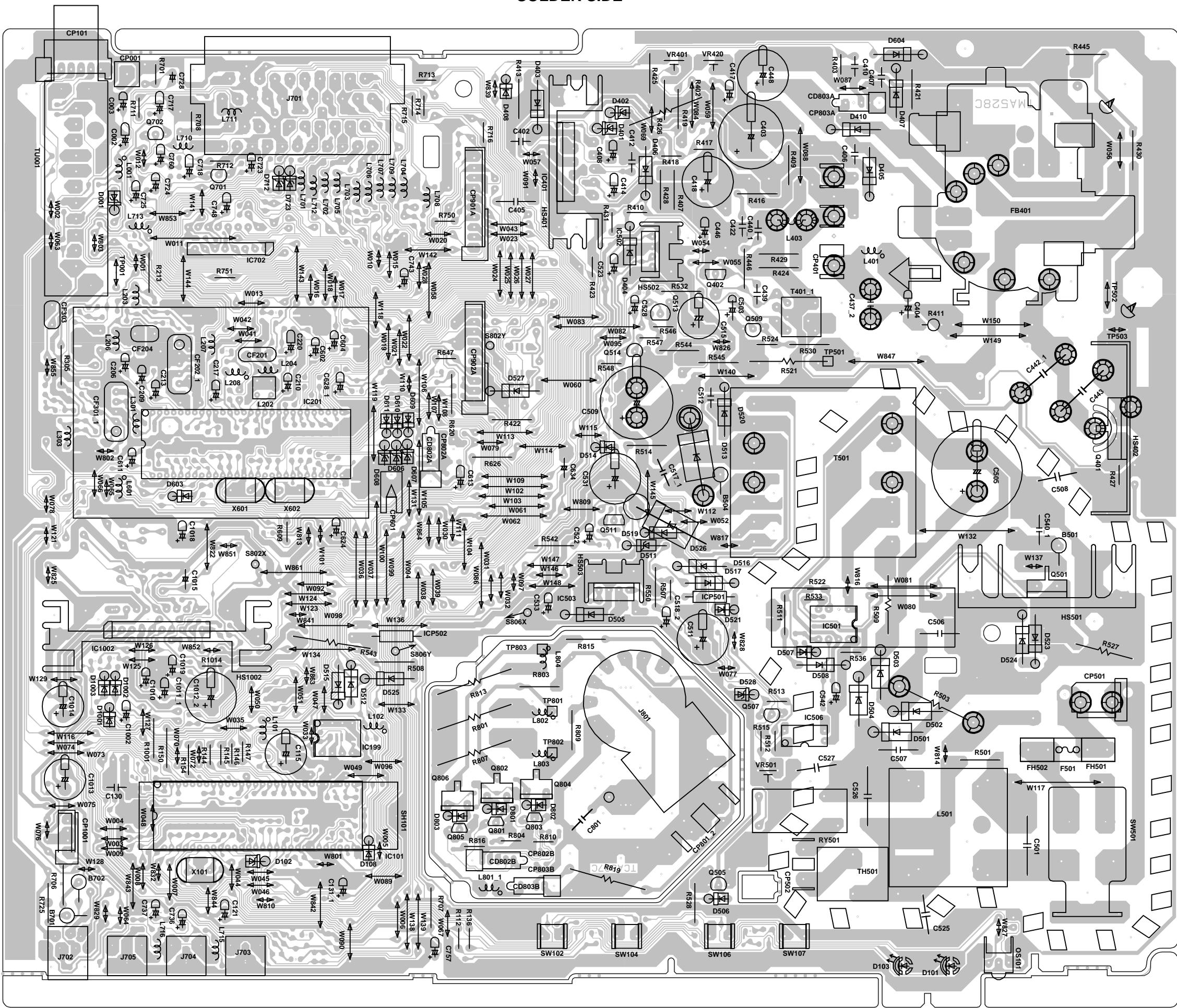
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



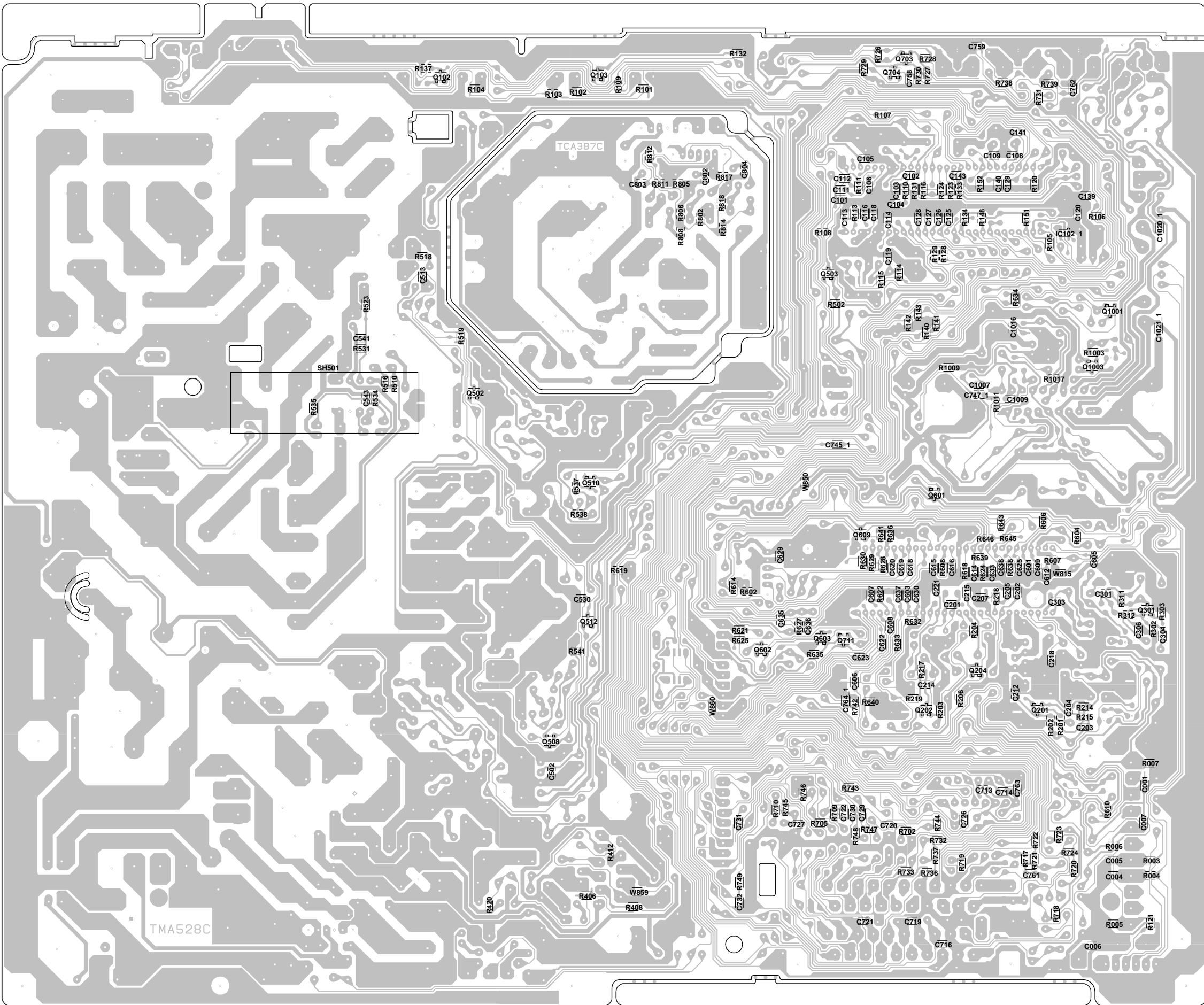
BLOCK DIAGRAM



**PRINTED CIRCUIT BOARDS
MAIN/CRT (INSERTED PARTS)
SOLDER SIDE**

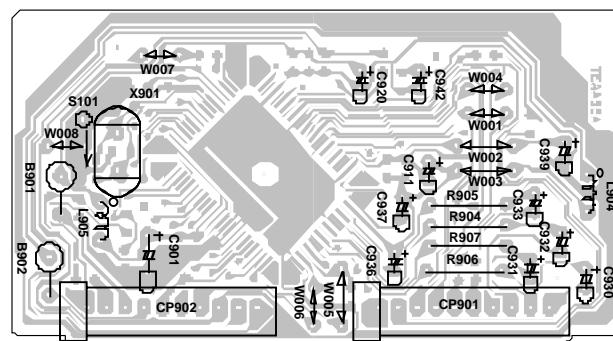


PRINTED CIRCUIT BOARDS MAIN/CRT (CHIP MOUNTED PARTS) SOLDER SIDE

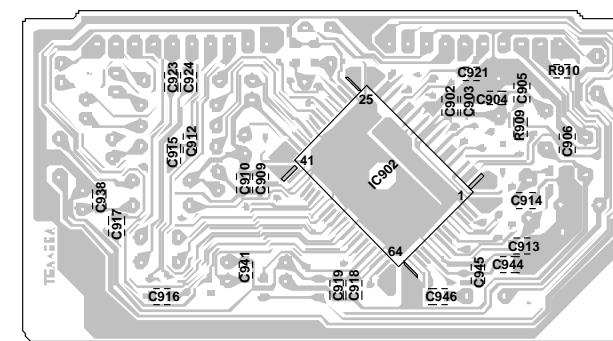


PRINTED CIRCUIT BOARDS

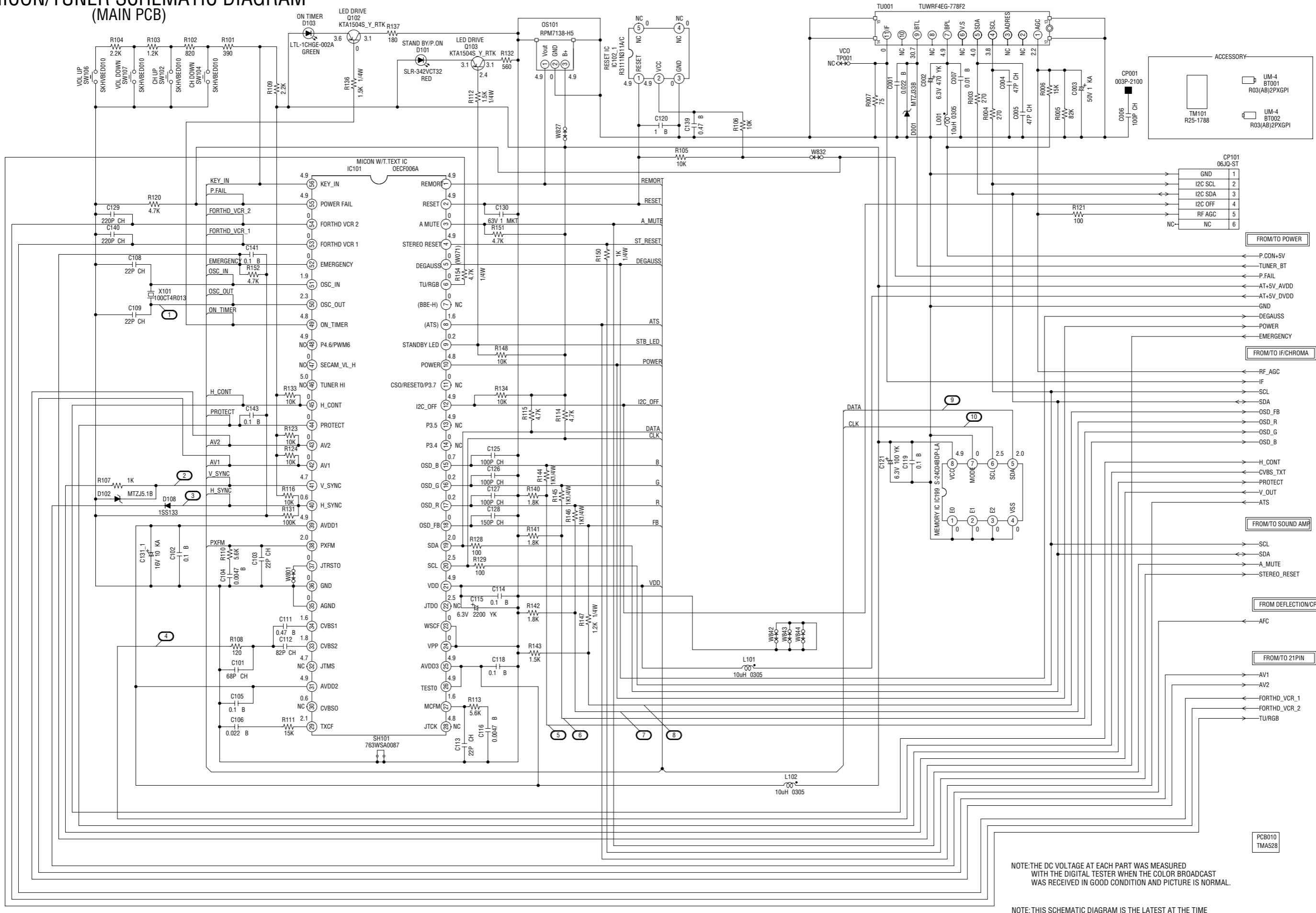
STEREO (INSERTED PARTS) SOLDER SIDE



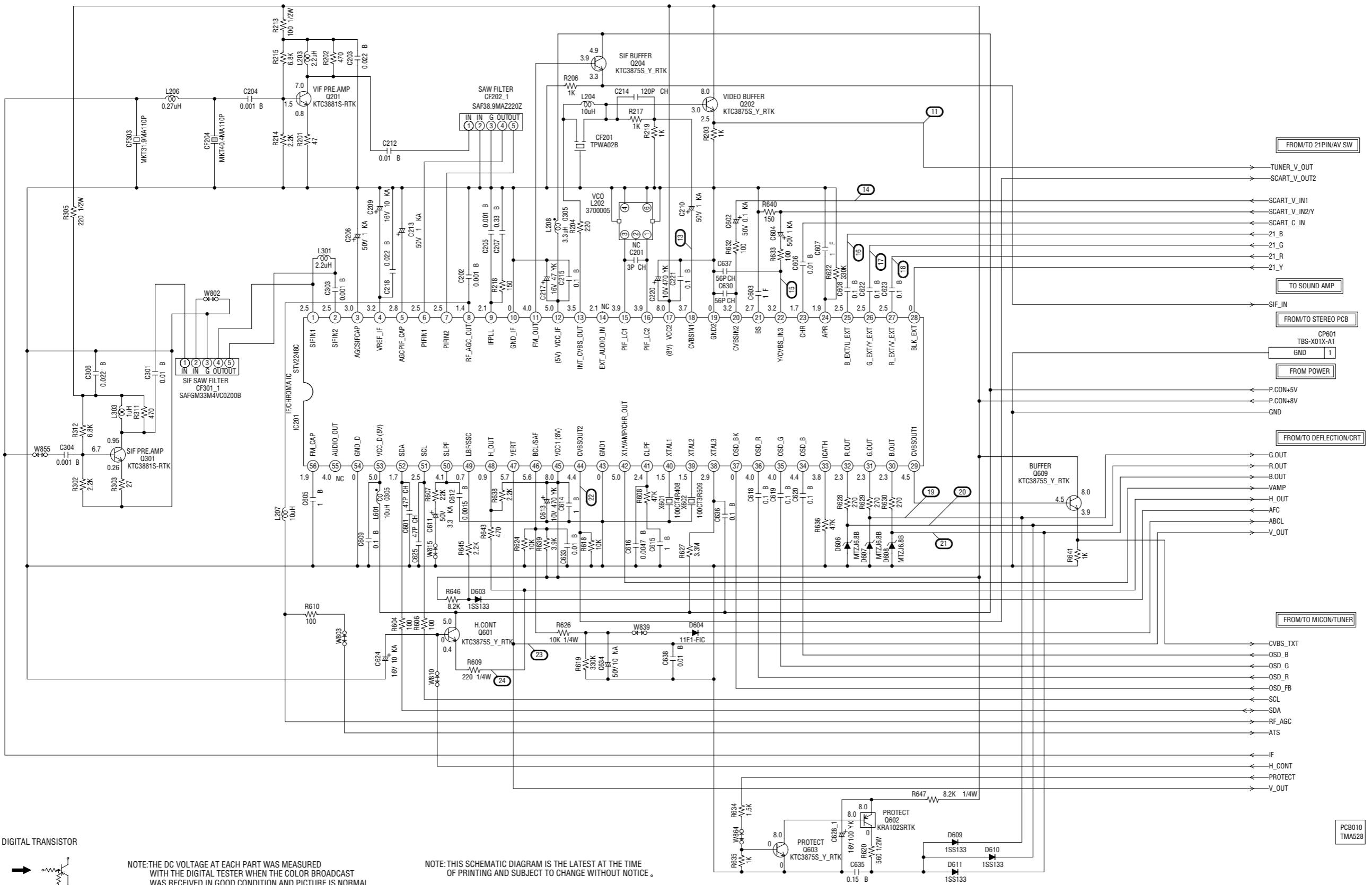
STEREO (CHIP MOUNTED PARTS) SOLDER SIDE



MICON/TUNER SCHEMATIC DIAGRAM (MAIN PCB)



IF/CHROMA SCHEMATIC DIAGRAM (MAIN PCB)



CAUTION: DIGITAL TRANSISTOR

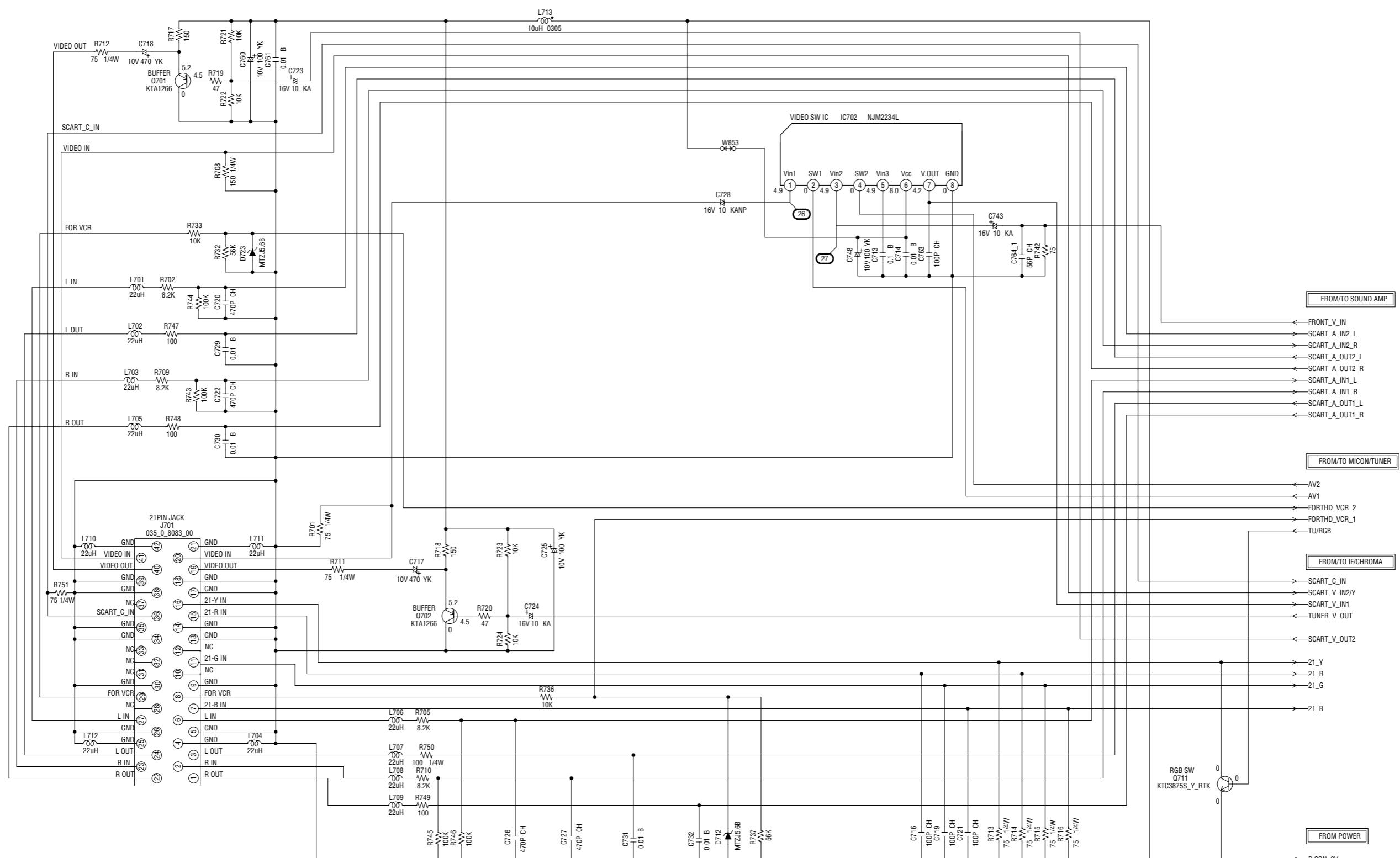
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED
WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST
WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE

G-3

21PIN SCHEMATIC DIAGRAM

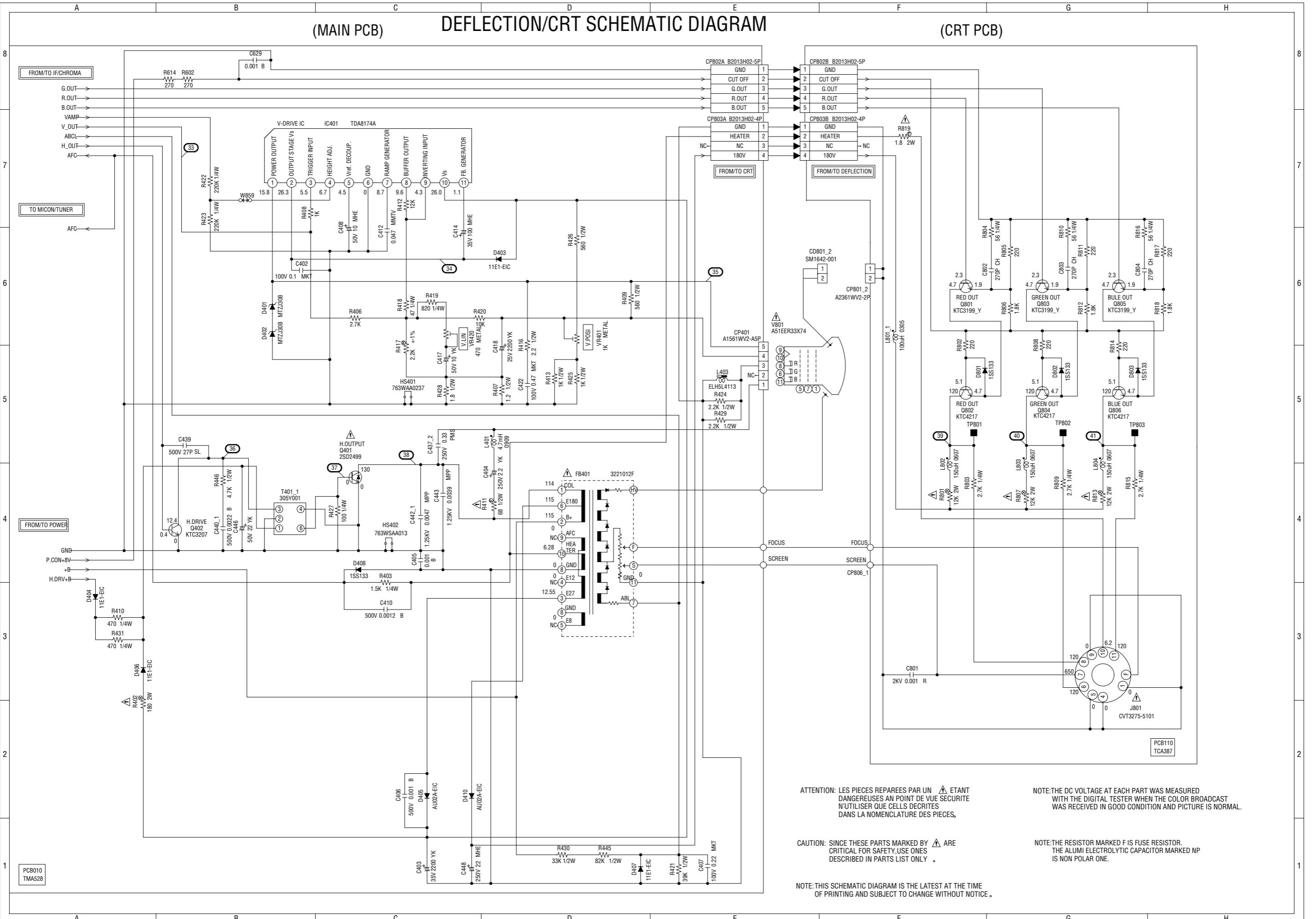
(MAIN PCB)



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

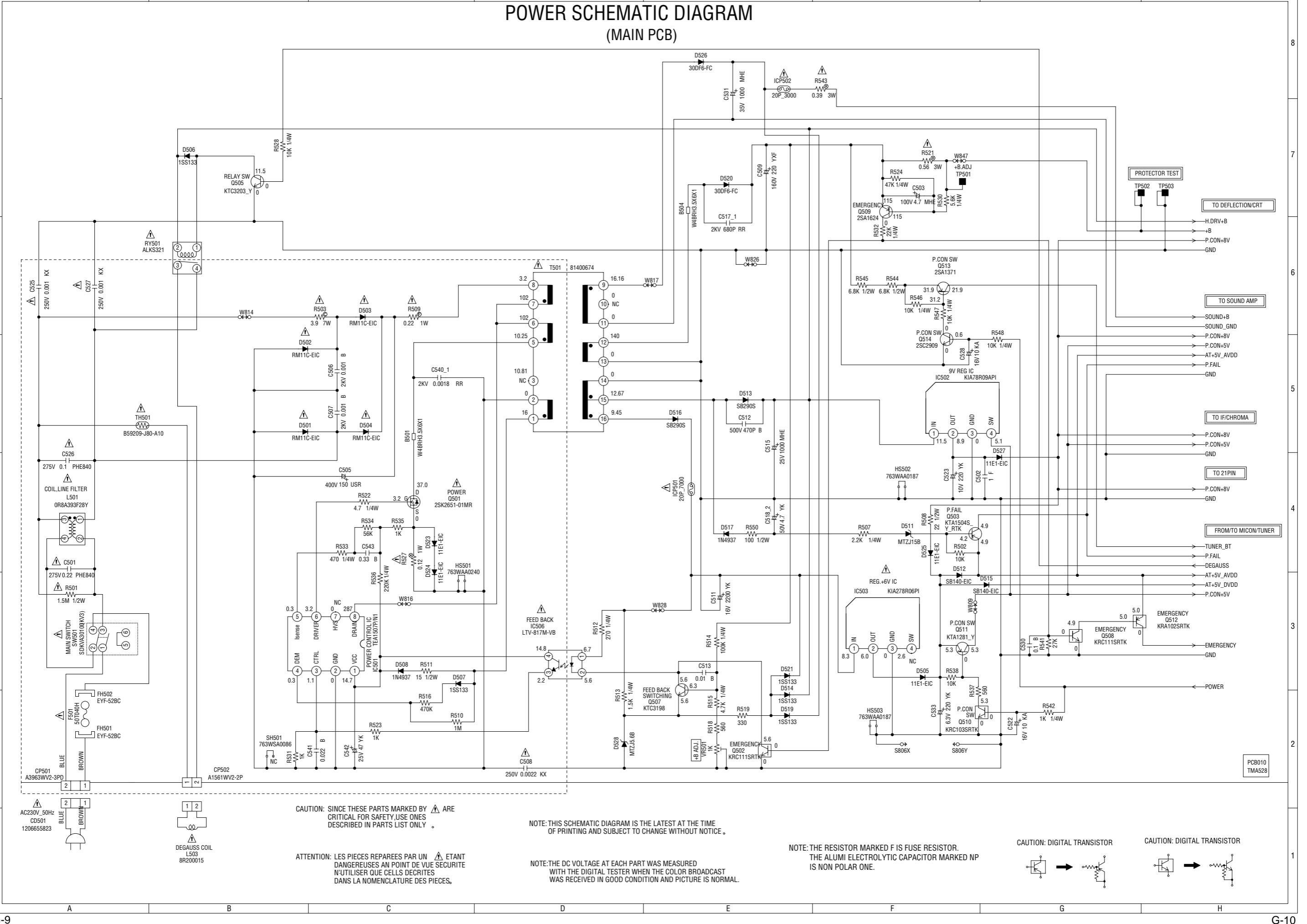
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

DEFLECTION/CRT SCHEMATIC DIAGRAM

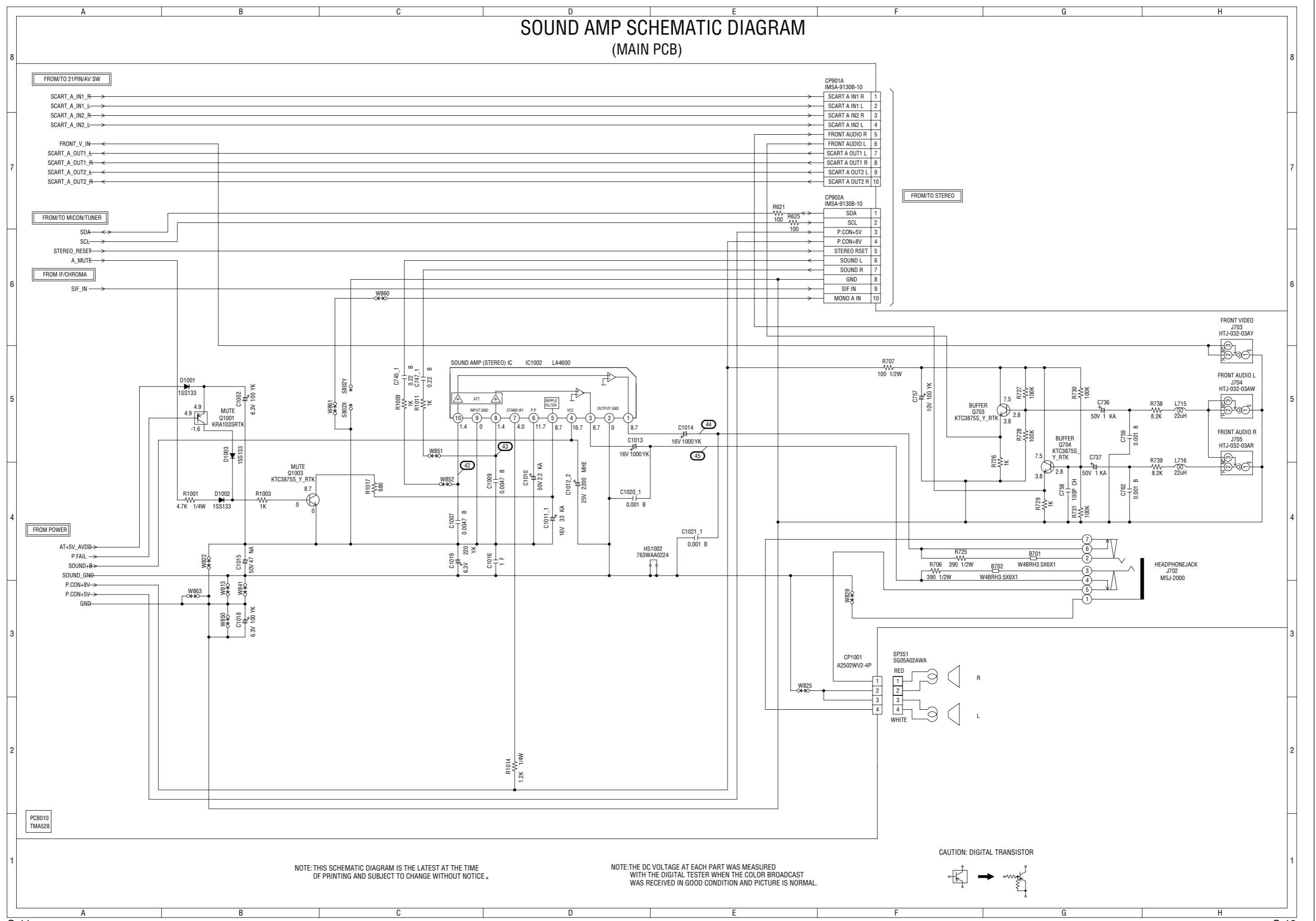


POWER SCHEMATIC DIAGRAM

(MAIN PCB)

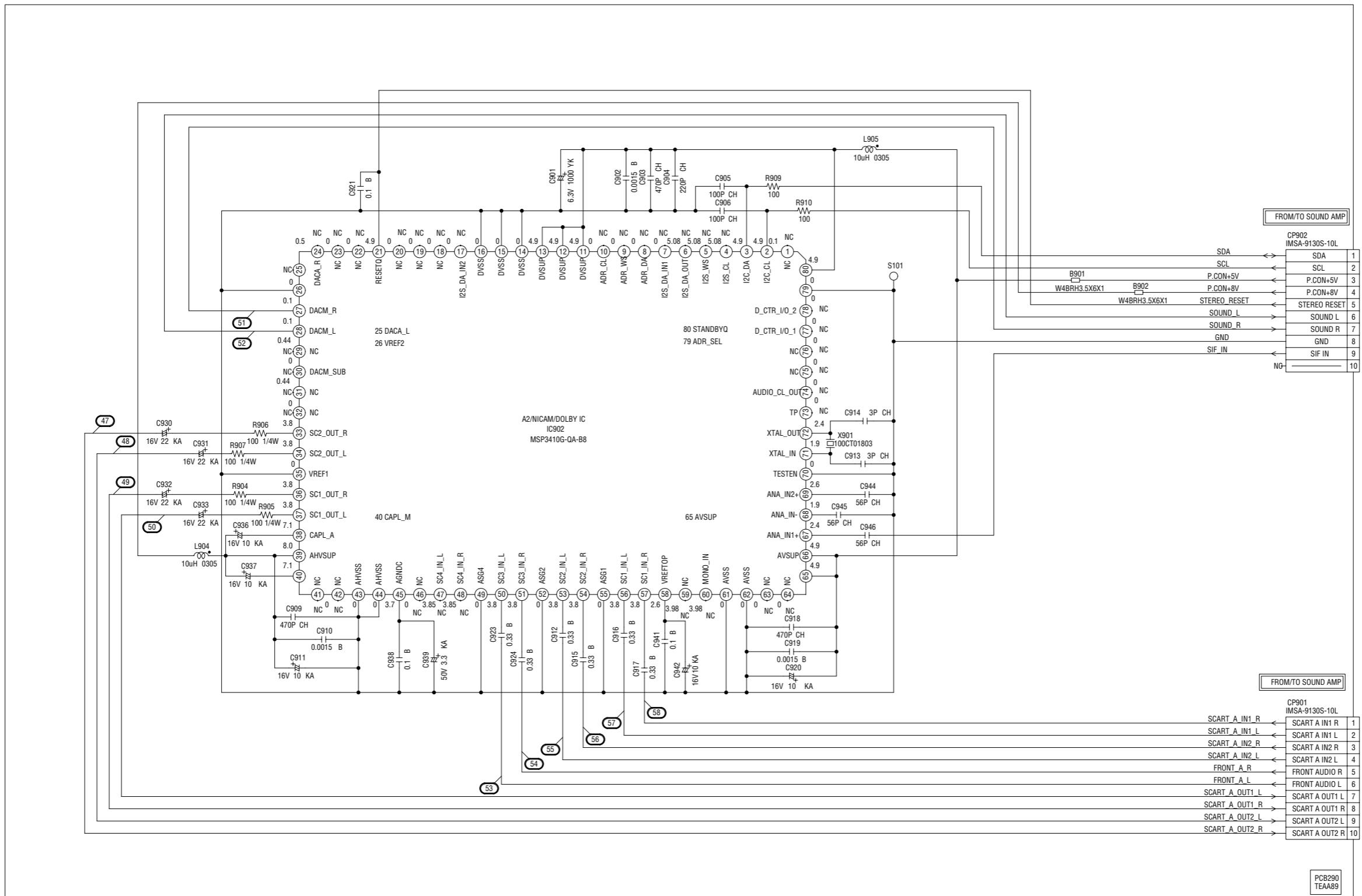


SOUND AMP SCHEMATIC DIAGRAM (MAIN PCB)



STEREO SCHEMATIC DIAGRAM

(STEREO PCB)

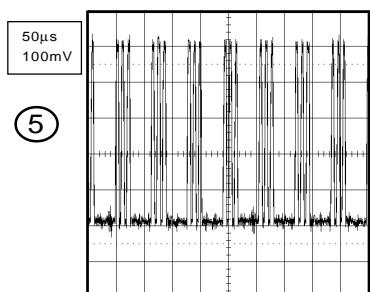
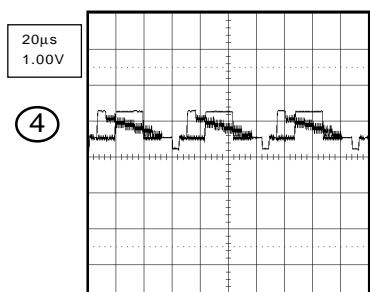
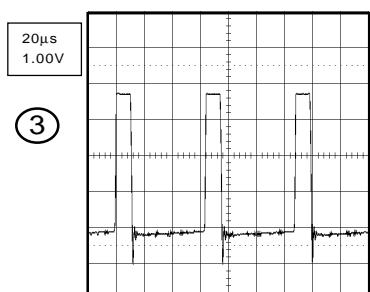
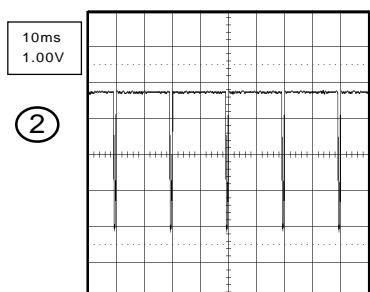
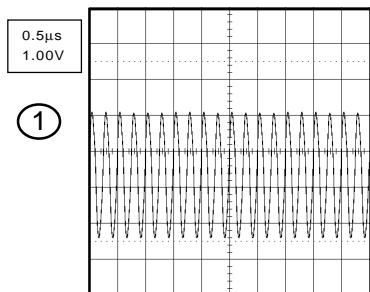


NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME
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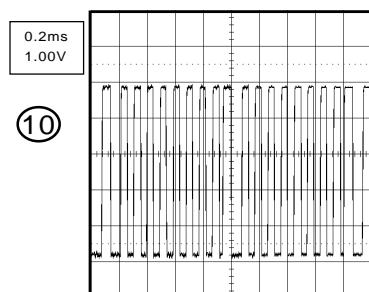
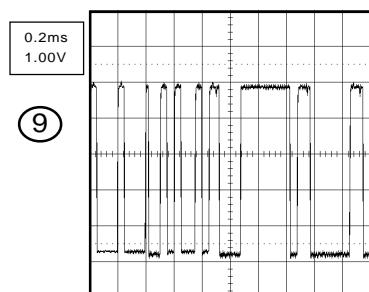
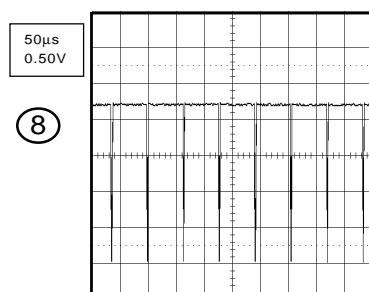
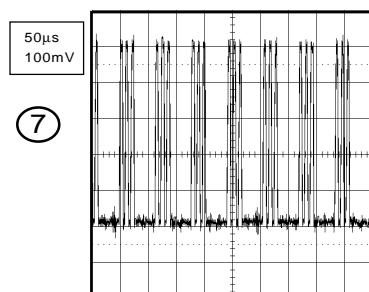
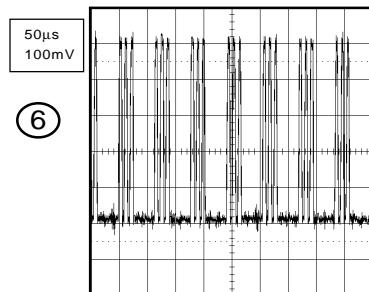
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED
WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST
WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

WAVEFORMS

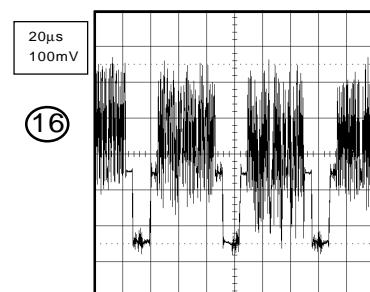
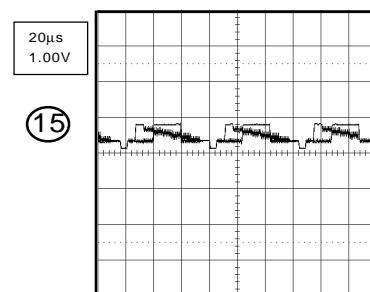
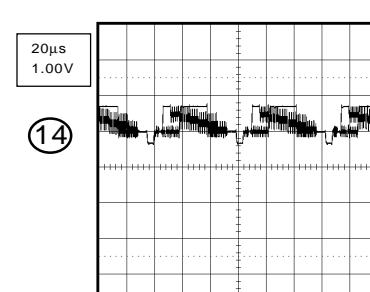
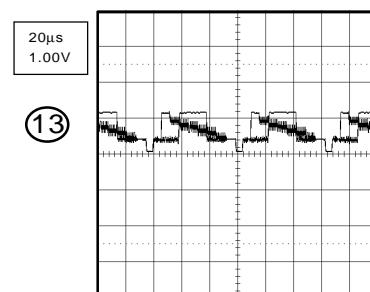
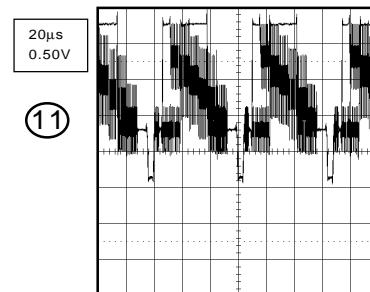
MICON/TUNER



IF/CHROMA

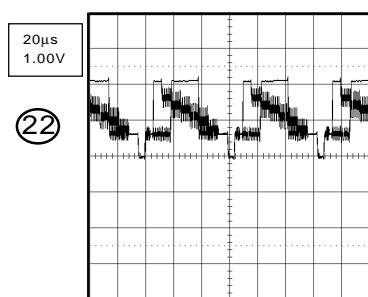
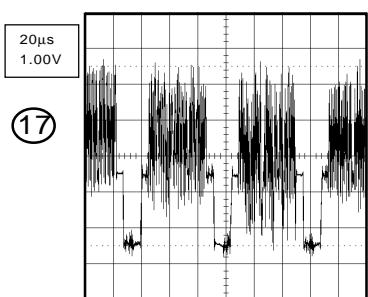


IF/CHROMA

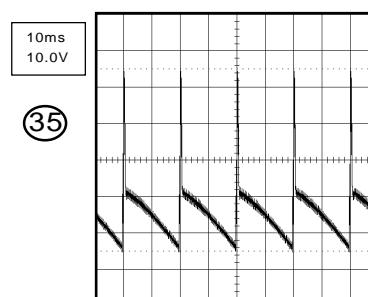
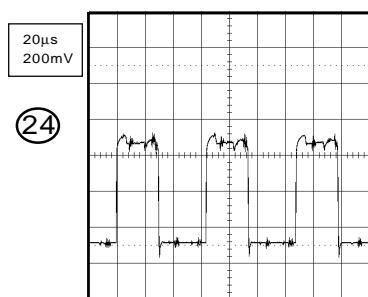
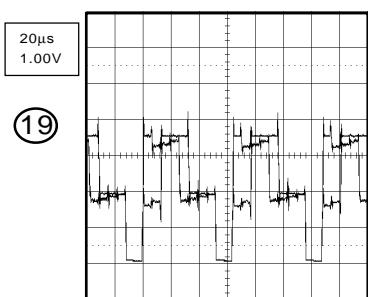
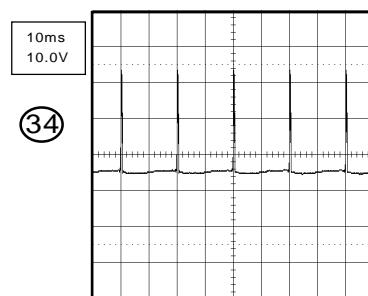
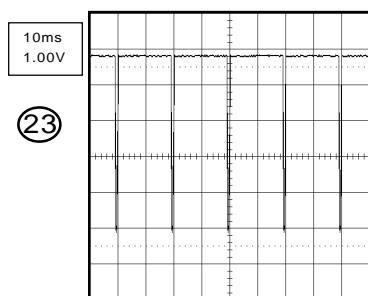
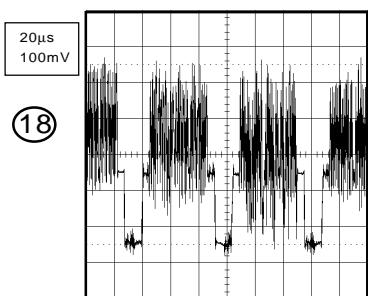
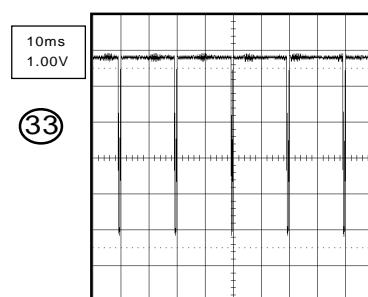


NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

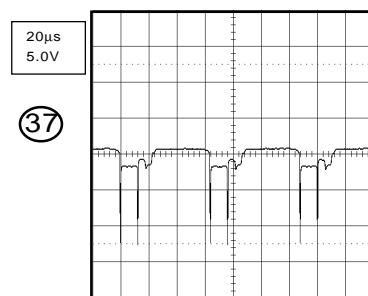
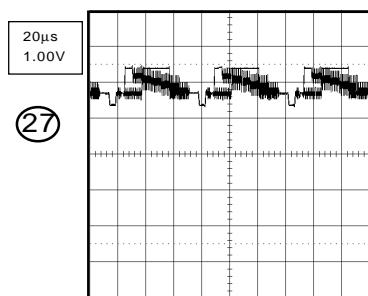
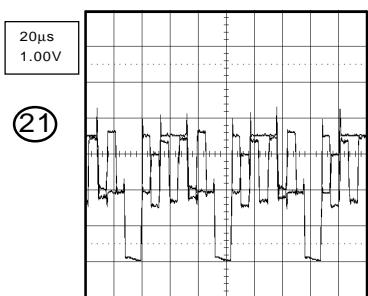
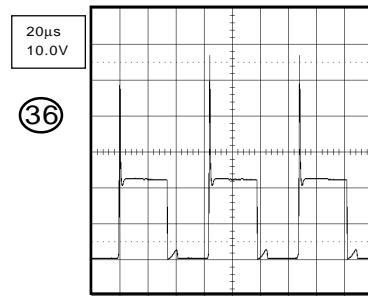
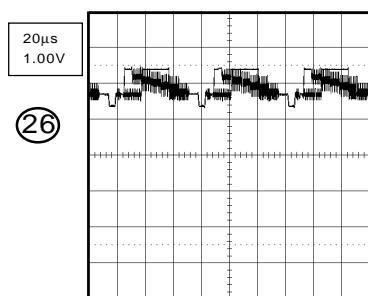
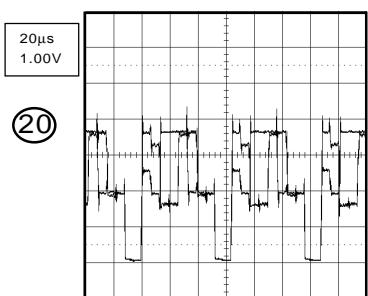
WAVEFORMS



DEFLECTION/CRT

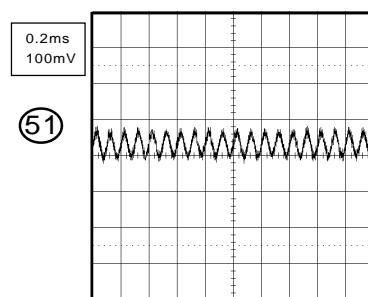
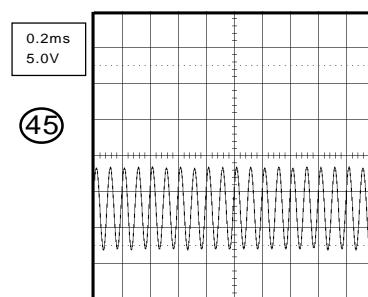
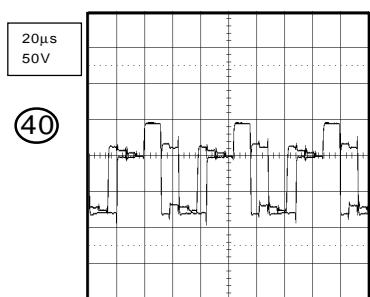
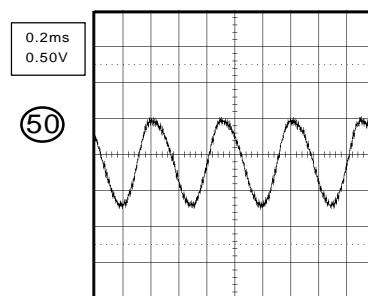
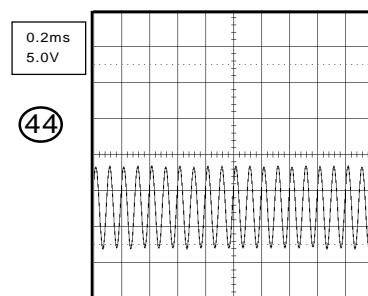
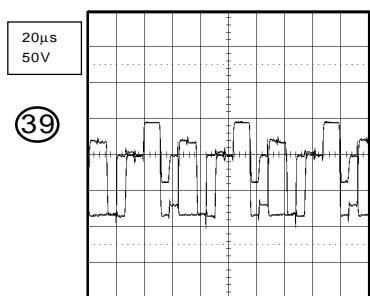
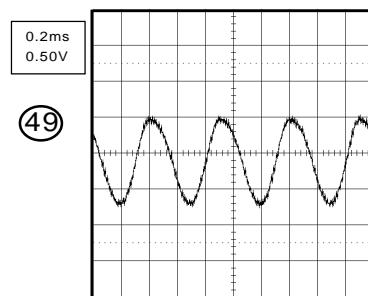
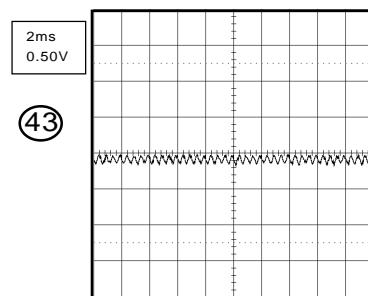
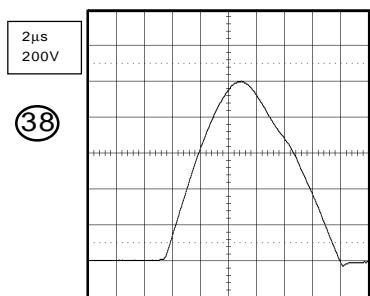


21PIN

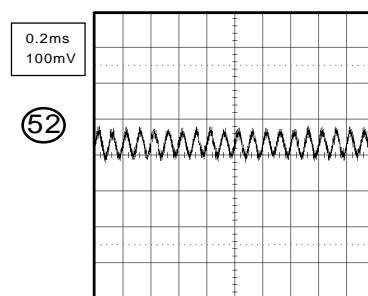
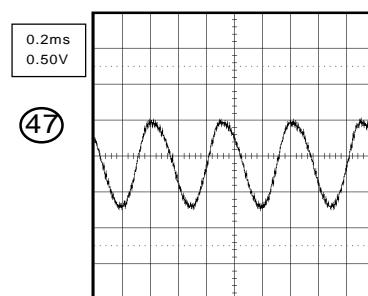
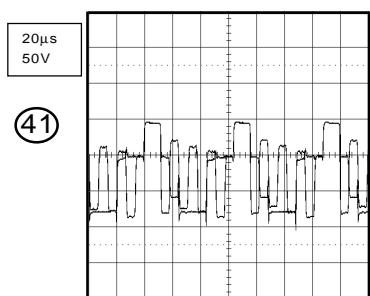


NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

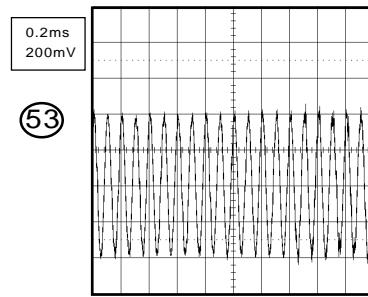
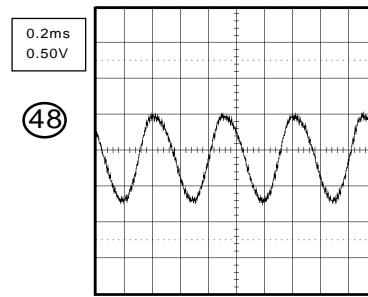
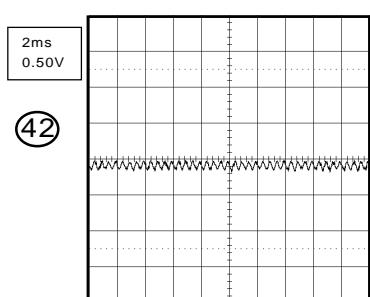
WAVEFORMS



STEREO

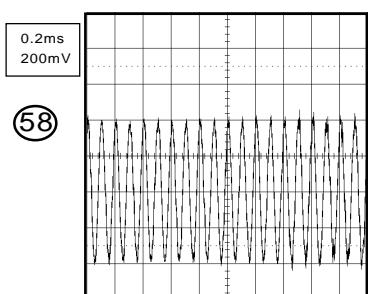
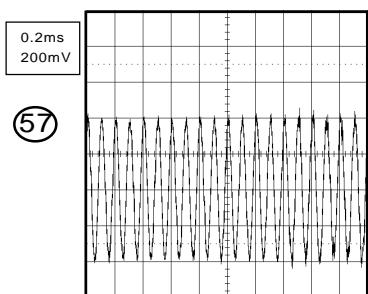
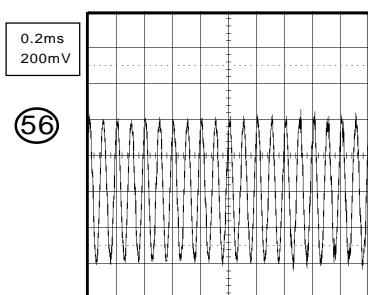
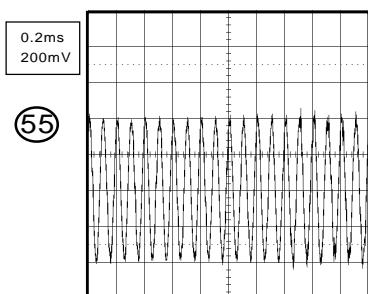
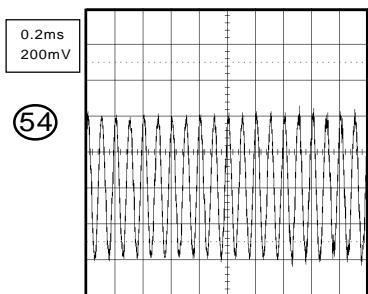


SOUND AMP



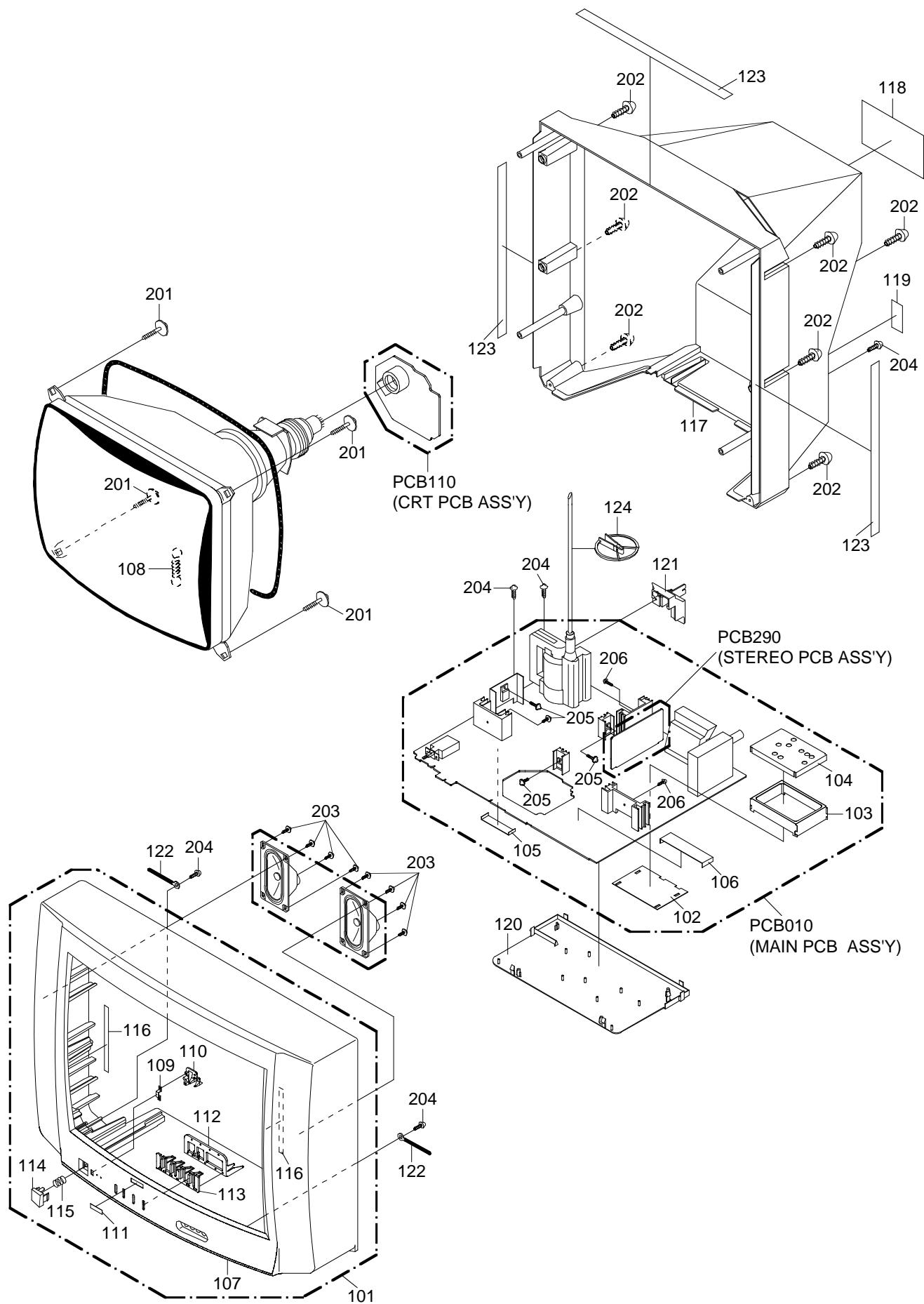
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS



NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

MECHANICAL EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
101	A3L903G720	CABINET,FRONT ASSY
102	752WSAA006	PLATE,SHIELD
103	752WSAA008	SHIELD,CASE
104	752WSAA013	SHIELD,LID
105	752WSA0086	SHIELD,IC(30P,40P)
106	752WSA0087	SHIELD,IC
107	701UPJA106	CABINET,FRONT
108	741WUA0001	SPRING,EARTH
109	711WPAA080	PLATE,FRONT
110	713UPAA001	GUIDE,REMOCON
111	7235490022	BADGE,BRAND
112	735UPAA014	BUTTON,BASE
113	735UPBA014	BUTTON,FRAME
114	735UPBA013	BUTTON,POWER
115	743WKA0040	SPRING,BUTTON
116	800WQ00045	FELT SHEET
117	702UPA0257	CABINET,BACK
118	722549A127	SHEET,RATING
119	7230007471	SHEET,JACK
120	755WPA0031	COVER,PCB
121	761WPA0254	HOLDER,FBT
122	8995034000	CORD CLIP UL CO.
123	800UQ00009	FELT SHEET
124	899HV3T001	HOLDER,ANODE WIRE
201	8121J50B54	SCREW,TAPPING(B0) GW20 5x28
202	8117540A64	SCREW,TAPPING(B0) TRUSS 4x16
203	8110630804	SCREW,TAP TITE(P) BRAZIER 3x8
204	8110630A04	SCREW,TAP TITE(P) BRAZIER 3x10
205	8109I30A04	SCREW,TAP TITE(B) WHT 3x10
206	8107630804	SCREW,TAP TITE(S) BRAZIER 3x8
---	723000B995	SHEET,BAR CODE
---	791WHA0085	LAMIFILM,BAG
---	792UHAA027	PACKAGE, TOP
---	792UHAA028	PACKAGE,BOTTOM
---	793UCDB027	GIFT BOX
---	A3L903G975	INSTRUCTION BOOK KIT
---	JB5XDA00	POLYBAG,INSTRUCTION(RED CAUTION)
---	J3L90301	INSTRUCTION BOOK(SW)
---	J3L90307	QUICK SET-UP SHEET(SW)
---	J3L90310	INSTRUCTION BOOK(N)
---	J3L90311	INSTRUCTION BOOK(S)
---	J3L90351	INSTRUCTION BOOK(PR)
---	J3L90361	INSTRUCTION BOOK(E)
---	J3L90370	QUICK SET-UP SHEET(N)
---	J3L90371	QUICK SET-UP SHEET(S)
---	J3L90373	QUICK SET-UP SHEET(PR)
---	J3L90374	QUICK SET-UP SHEET(E)

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION	
RESISTORS				RESISTORS			
R003	R801R7271J	RC	270 OHM 1/10W	R421	R002T2393J	RC	39K OHM 1/2W
R004	R801R7271J	RC	270 OHM 1/10W	R422	R002T4224J	RC	220K OHM 1/4W
R005	R801R7823J	RC	82K OHM 1/10W	R423	R002T4224J	RC	220K OHM 1/4W
R006	R801R7153J	RC	15K OHM 1/10W	R424	R002T2222J	RC	2.2K OHM 1/2W
R007	R801R7750J	RC	75 OHM 1/10W	R425	R002T2102J	RC	1K OHM 1/2W
R101	R801R7391J	RC	390 OHM 1/10W	R426	R002T2561J	RC	560 OHM 1/2W
R102	R801R7821J	RC	820 OHM 1/10W	R427	R002T4101J	RC	100 OHM 1/4W
R103	R801R7122J	RC	1.2K OHM 1/10W	R428	R002T21R8J	RC	1.8 OHM 1/2W
R104	R801R7222J	RC	2.2K OHM 1/10W	R429	R002T2222J	RC	2.2K OHM 1/2W
R105	R801R7103J	RC	10K OHM 1/10W	R430	R002T2333J	RC	33K OHM 1/2W
R106	R801R7103J	RC	10K OHM 1/10W	R431	R002T4471J	RC	470 OHM 1/4W
R107	R801R7102J	RC	1K OHM 1/10W	R445	R002T2823J	RC	82K OHM 1/2W
R108	R801R7121J	RC	120 OHM 1/10W	R446	R002T2472J	RC	4.7K OHM 1/2W
R109	R801R7222J	RC	2.2K OHM 1/10W	△ R501	R002T2155J	RC	1.5M OHM 1/2W
R110	R801R7562J	RC	5.6K OHM 1/10W	R502	R801R7103J	RC	10K OHM 1/10W
R111	R801R7153J	RC	15K OHM 1/10W	△ R503	R5X2AE3R9J	R,CEMENT	3.9 OHM 7W
R112	R002T4152J	RC	1.5K OHM 1/4W	R507	R002T4222J	RC	2.2K OHM 1/4W
R113	R801R7562J	RC	5.6K OHM 1/10W	R508	R002T2220J	RC	22 OHM 1/2W
R114	R801R7472J	RC	4.7K OHM 1/10W	△ R509	R63581R22J	R,FUSE	0.22 OHM 1W
R115	R801R7472J	RC	4.7K OHM 1/10W	R510	R801R7105J	RC	1M OHM 1/10W
R116	R801R7103J	RC	10K OHM 1/10W	R511	R002T2150J	RC	15 OHM 1/2W
R120	R801R7472J	RC	4.7K OHM 1/10W	R512	R002T4271J	RC	270 OHM 1/4W
R121	R801R7101J	RC	100 OHM 1/10W	R513	R002T4152J	RC	1.5K OHM 1/4W
R123	R801R7103J	RC	10K OHM 1/10W	R514	R002T4104J	RC	100K OHM 1/4W
R124	R801R7103J	RC	10K OHM 1/10W	R515	R002T4472J	RC	4.7K OHM 1/4W
R128	R801R7101J	RC	100 OHM 1/10W	R516	R801R7474J	RC	470K OHM 1/10W
R129	R801R7101J	RC	100 OHM 1/10W	R518	R801R7561J	RC	560 OHM 1/10W
R131	R801R7104J	RC	100K OHM 1/10W	R519	R801R7331J	RC	330 OHM 1/10W
R132	R801R7561J	RC	560 OHM 1/10W	△ R521	R3X28BR56J	R,METAL OXIDE	0.56 OHM 3W
R133	R801R7103J	RC	10K OHM 1/10W	R522	R002T44R7J	RC	4.7 OHM 1/4W
R134	R801R7103J	RC	10K OHM 1/10W	R523	R801R7102J	RC	1K OHM 1/10W
R136	R002T4152J	RC	1.5K OHM 1/4W	R524	R002T4473J	RC	47K OHM 1/4W
R137	R801R7181J	RC	180 OHM 1/10W	△ R527	R3X181R12J	R,METAL OXIDE	0.12 OHM 1W
R140	R801R7182J	RC	1.8K OHM 1/10W	R528	R002T4103J	RC	10K OHM 1/4W
R141	R801R7182J	RC	1.8K OHM 1/10W	R530	R002T4562J	RC	5.6K OHM 1/4W
R142	R801R7182J	RC	1.8K OHM 1/10W	R531	R801R7102J	RC	1K OHM 1/10W
R143	R801R7152J	RC	1.5K OHM 1/10W	R532	R002T4223J	RC	22K OHM 1/4W
R144	R002T4102J	RC	1K OHM 1/4W	R533	R002T4471J	RC	470 OHM 1/4W
R145	R002T4102J	RC	1K OHM 1/4W	R534	R801R7563J	RC	56K OHM 1/10W
R146	R002T4102J	RC	1K OHM 1/4W	R535	R801R7102J	RC	1K OHM 1/10W
R147	R002T4122J	RC	1.2K OHM 1/4W	R536	R002T4224J	RC	220K OHM 1/4W
R148	R801R7103J	RC	10K OHM 1/10W	R537	R801R7561J	RC	560 OHM 1/10W
R150	R002T4102J	RC	1K OHM 1/4W	R538	R801R7103J	RC	10K OHM 1/10W
R151	R801R7472J	RC	4.7K OHM 1/10W	R541	R801R7273J	RC	27K OHM 1/10W
R152	R801R7472J	RC	4.7K OHM 1/10W	R542	R002T4102J	RC	1K OHM 1/4W
R154	R002T4472J	RC	4.7K OHM 1/4W	△ R543	R3X28BR39J	R,METAL OXIDE	0.39 OHM 3W
R201	R801R7470J	RC	47 OHM 1/10W	R544	R002T2682J	RC	6.8K OHM 1/2W
R202	R801R7471J	RC	470 OHM 1/10W	R545	R002T2682J	RC	6.8K OHM 1/2W
R203	R801R7102J	RC	1K OHM 1/10W	R546	R002T4103J	RC	10K OHM 1/4W
R204	R801R7221J	RC	220 OHM 1/10W	R547	R002T4103J	RC	10K OHM 1/4W
R206	R801R7102J	RC	1K OHM 1/10W	R548	R002T4103J	RC	10K OHM 1/4W
R213	R002T2101J	RC	100 OHM 1/2W	R550	R002T2101J	RC	100 OHM 1/2W
R214	R801R7222J	RC	2.2K OHM 1/10W	R602	R801R7271J	RC	270 OHM 1/10W
R215	R801R7682J	RC	6.8K OHM 1/10W	R604	R801R7101J	RC	100 OHM 1/10W
R217	R801R7102J	RC	1K OHM 1/10W	R606	R801R7101J	RC	100 OHM 1/10W
R218	R801R7151J	RC	150 OHM 1/10W	R607	R801R7223J	RC	22K OHM 1/10W
R219	R801R7102J	RC	1K OHM 1/10W	R608	R801R7473J	RC	47K OHM 1/10W
R302	R801R7222J	RC	2.2K OHM 1/10W	R609	R002T4221J	RC	220 OHM 1/4W
R303	R801R7270J	RC	27 OHM 1/10W	R610	R801R7101J	RC	100 OHM 1/10W
R305	R002T2221J	RC	220 OHM 1/2W	R614	R801R7271J	RC	270 OHM 1/10W
R311	R801R7471J	RC	470 OHM 1/10W	R618	R801R7103J	RC	10K OHM 1/10W
R312	R801R7682J	RC	6.8K OHM 1/10W	R619	R801R7334J	RC	330K OHM 1/10W
△ R402	R3X18A181J	R,METAL OXIDE	180 OHM 2W	R620	R002T2561J	RC	560 OHM 1/2W
R403	R002T4152J	RC	1.5K OHM 1/4W	R621	R801R7101J	RC	100 OHM 1/10W
R406	R801R7272J	RC	2.7K OHM 1/10W	R622	R801R7334J	RC	330K OHM 1/10W
R407	R002T21R2J	RC	1.2 OHM 1/2W	R624	R801R7103J	RC	10K OHM 1/10W
R408	R801R7102J	RC	1K OHM 1/10W	R625	R801R7101J	RC	100 OHM 1/10W
R409	R002T2561J	RC	560 OHM 1/2W	R626	R002T4103J	RC	10K OHM 1/4W
R410	R002T4471J	RC	470 OHM 1/4W	R627	R801R7335J	RC	3.3M OHM 1/10W
△ R411	R655U2680J	R,FUSE	68 OHM 1/2W	R628	R801R7271J	RC	270 OHM 1/10W
R412	R801R7123J	RC	12K OHM 1/10W	R629	R801R7271J	RC	270 OHM 1/10W
R413	R002T2102J	RC	1K OHM 1/2W	R630	R801R7271J	RC	270 OHM 1/10W
R416	R002T22R2J	RC	2.2 OHM 1/2W	R632	R801R7101J	RC	100 OHM 1/10W
R417	R4X5T6222F	R,METAL	2.2K OHM 1/6W	R633	R801R7101J	RC	100 OHM 1/10W
R418	R002T4470J	RC	47 OHM 1/4W	R634	R801R7152J	RC	1.5K OHM 1/10W
R419	R002T4821J	RC	820 OHM 1/4W	R635	R801R7102J	RC	1K OHM 1/10W
R420	R801R7103J	RC	10K OHM 1/10W	R636	R801R7473J	RC	47K OHM 1/10W

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION	
RESISTORS				RESISTORS			
R638	R801R7222J	RC	2.2K OHM 1/10W	R910	R801R7101J	RC	100 OHM 1/10W
R639	R801R7392J	RC	3.9K OHM 1/10W	R1001	R002T4472J	RC	4.7K OHM 1/4W
R640	R801R7151J	RC	150 OHM 1/10W	R1003	R801R7102J	RC	1K OHM 1/10W
R641	R801R7102J	RC	1K OHM 1/10W	R1009	R801R7102J	RC	1K OHM 1/10W
R643	R801R7471J	RC	470 OHM 1/10W	R1011	R801R7102J	RC	1K OHM 1/10W
R645	R801R7222J	RC	2.2K OHM 1/10W	R1014	R002T4122J	RC	1.2K OHM 1/4W
R646	R801R7822J	RC	8.2K OHM 1/10W	R1017	R801R7681J	RC	680 OHM 1/10W
R647	R002T4822J	RC	8.2K OHM 1/4W	CAPACITORS			
R701	R002T4750J	RC	75 OHM 1/4W	C001	CS0RB04H4K	CC	0.022 UF 50V B
R702	R801R7822J	RC	8.2K OHM 1/10W	C002	E02LU0471M	CE	470 UF 6.3V
R705	R801R7822J	RC	8.2K OHM 1/10W	C003	E50HU5010M	CE	1 UF 50V
R706	R002T2391J	RC	390 OHM 1/2W	C004	CS0RCH4Q1J	CC	47 PF 50V CH
R707	R002T2101J	RC	100 OHM 1/2W	C005	CS0RCH4Q1J	CC	47 PF 50V CH
R708	R002T4151J	RC	150 OHM 1/4W	C006	CS0RCH412J	CC	100 PF 50V CH
R709	R801R7822J	RC	8.2K OHM 1/10W	C007	CS0RB0414K	CC	0.01 UF 50V B
R710	R801R7822J	RC	8.2K OHM 1/10W	C101	CS0RCH4U1J	CC	68 PF 50V CH
R711	R002T4750J	RC	75 OHM 1/4W	C102	CS0RB0315K	CC	0.1 UF 25V B
R712	R002T4750J	RC	75 OHM 1/4W	C103	CS0RCH4H1J	CC	22 PF 50V CH
R713	R002T4750J	RC	75 OHM 1/4W	C104	CS0RB04Q3K	CC	0.0047UF 50V B
R714	R002T4750J	RC	75 OHM 1/4W	C105	CS0RB0315K	CC	0.1 UF 25V B
R715	R002T4750J	RC	75 OHM 1/4W	C106	CS0RB04H4K	CC	0.022 UF 50V B
R716	R002T4750J	RC	75 OHM 1/4W	C108	CS0RCH4H1J	CC	22 PF 50V CH
R717	R801R7151J	RC	150 OHM 1/10W	C109	CS0RCH4H1J	CC	22 PF 50V CH
R718	R801R7151J	RC	150 OHM 1/10W	C111	CS0RB02Q5K	CC	0.47 UF 16V B
R719	R801R7470J	RC	47 OHM 1/10W	C112	CS0RCH4W1J	CC	82 PF 50V CH
R720	R801R7470J	RC	47 OHM 1/10W	C113	CS0RCH4H1J	CC	22 PF 50V CH
R721	R801R7103J	RC	10K OHM 1/10W	C114	CS0RB0315K	CC	0.1 UF 25V B
R722	R801R7103J	RC	10K OHM 1/10W	C115	E02LT0222M	CE	2200 UF 6.3V
R723	R801R7103J	RC	10K OHM 1/10W	C116	CS0RB04Q3K	CC	0.0047UF 50V B
R724	R801R7103J	RC	10K OHM 1/10W	C118	CS0RB0315K	CC	0.1 UF 25V B
R725	R002T2391J	RC	390 OHM 1/2W	C119	CS0RB0315K	CC	0.1 UF 25V B
R726	R801R7102J	RC	1K OHM 1/10W	C120	CS0RB0216K	CC	1 UF 16V B
R727	R801R7104J	RC	100K OHM 1/10W	C121	E02LU0101M	CE	100 UF 6.3V
R728	R801R7104J	RC	100K OHM 1/10W	C125	CS0RCH412J	CC	100 PF 50V CH
R729	R801R7102J	RC	1K OHM 1/10W	C126	CS0RCH412J	CC	100 PF 50V CH
R730	R801R7104J	RC	100K OHM 1/10W	C127	CS0RCH412J	CC	100 PF 50V CH
R731	R801R7104J	RC	100K OHM 1/10W	C128	CS0RCH4E2J	CC	150 PF 50V CH
R732	R801R7563J	RC	56K OHM 1/10W	C129	CS0RCH4H2J	CC	220 PF 50V CH
R733	R801R7103J	RC	10K OHM 1/10W	C130	P235WE105J	CMP	1 UF 63V MKT
R736	R801R7103J	RC	10K OHM 1/10W	C131	E50HU2100M	CE	10 UF 16V
R737	R801R7563J	RC	56K OHM 1/10W	C139	CS0RB02Q5K	CC	0.47 UF 16V B
R738	R801R7822J	RC	8.2K OHM 1/10W	C140	CS0RCH4H2J	CC	220 PF 50V CH
R739	R801R7822J	RC	8.2K OHM 1/10W	C141	CS0RB0315K	CC	0.1 UF 25V B
R742	R801R7750J	RC	75 OHM 1/10W	C143	CS0RB0215K	CC	0.1 UF 16V B
R743	R801R7104J	RC	100K OHM 1/10W	C201	CS0RCH430C	CC	3 PF 50V CH
R744	R801R7104J	RC	100K OHM 1/10W	C202	CS0RB0413K	CC	0.001 UF 50V B
R745	R801R7104J	RC	100K OHM 1/10W	C203	CS0RB04H4K	CC	0.022 UF 50V B
R746	R801R7104J	RC	100K OHM 1/10W	C204	CS0RB0413K	CC	0.001 UF 50V B
R747	R801R7101J	RC	100 OHM 1/10W	C205	CS0RB0413K	CC	0.001 UF 50V B
R748	R801R7101J	RC	100 OHM 1/10W	C206	E50HU5010M	CE	1 UF 50V
R749	R801R7101J	RC	100 OHM 1/10W	C207	CS0RB02L5K	CC	0.33 UF 16V B
R750	R002T4101J	RC	100 OHM 1/4W	C209	E50HU2100M	CE	10 UF 16V
R751	R002T4750J	RC	75 OHM 1/4W	C210	E50HU5010M	CE	1 UF 50V
△ R801	R3X18A123J	R,METAL OXIDE	12K OHM 2W	C212	CS0RB0414K	CC	0.01 UF 50V B
R802	R801R7221J	RC	220 OHM 1/10W	C213	E50HU5010M	CE	1 UF 50V
R803	R002T4272J	RC	2.7K OHM 1/4W	C214	CS0RCH4B2J	CC	120 PF 50V CH
R804	R002T4560J	RC	56 OHM 1/4W	C215	CS0RB0315K	CC	0.1 UF 25V B
R805	R801R7221J	RC	220 OHM 1/10W	C217	E02LU2470M	CE	47 UF 16V
R806	R801R7182J	RC	1.8K OHM 1/10W	C218	CS0RB04H4K	CC	0.022 UF 50V B
△ R807	R3X18A123J	R,METAL OXIDE	12K OHM 2W	C220	E02LU1471M	CE	470 UF 10V
R808	R801R7221J	RC	220 OHM 1/10W	C221	CS0RB0315K	CC	0.1 UF 25V B
R809	R002T4272J	RC	2.7K OHM 1/4W	C301	CS0RB0414K	CC	0.01 UF 50V B
R810	R002T4560J	RC	56 OHM 1/4W	C303	CS0RB0413K	CC	0.001 UF 50V B
R811	R801R7221J	RC	220 OHM 1/10W	C304	CS0RB0413K	CC	0.001 UF 50V B
R812	R801R7182J	RC	1.8K OHM 1/10W	C306	CS0RB04H4K	CC	0.022 UF 50V B
△ R813	R3X18A123J	R,METAL OXIDE	12K OHM 2W	C402	P235W1104J	CMP	0.1 UF 100V MKT
R814	R801R7221J	RC	220 OHM 1/10W	C403	E0ELF4222M	CE	2200 UF 35V
R815	R002T4272J	RC	2.7K OHM 1/4W	C404	E02LTD2R2M	CE	2.2 UF 250V
R816	R002T4560J	RC	56 OHM 1/4W	C405	CHGTB0413K	CC	0.001 UF 50V B
R817	R801R7221J	RC	220 OHM 1/10W	C406	C0JTB0513K	CC	0.001 UF 500V B
R818	R801R7182J	RC	1.8K OHM 1/10W	C407	P235W1224J	CMP	0.22 UF 100V MKT
△ R819	R6558A1R8J	R,FUSE	1.8 OHM 2W	C408	E5EZU5100M	CE	10 UF 50V
R904	R002T4101J	RC	100 OHM 1/4W	C410	C0JTB05B3K	CC	0.0012UF 500V B
R905	R002T4101J	RC	100 OHM 1/4W	C412	P232T0473J	CMPL	0.047 UF 50V MMTV
R906	R002T4101J	RC	100 OHM 1/4W	C414	E5EZU4101M	CE	100 UF 35V
R907	R002T4101J	RC	100 OHM 1/4W	C417	E02LU5100M	CE	10 UF 50V
R909	R801R7101J	RC	100 OHM 1/10W	C418	E02LF3222M	CE	2200 UF 25V

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION		
CAPACITORS				CAPACITORS				
C422	P235W1474J	CMP	0.47 UF 100V MKT	C724	E50HU2100M	CE	10 UF 16V	
C437	P4J7F3334J	CMPP	0.33 UF 250V PMS	C725	E02LU1101M	CE	100 UF 10V	
C439	C0JTS5K1J	CC	27 PF 500V SL	C726	CS0RCH4Q2J	CC	470 PF 50V CH	
C440	C0JTB05H3K	CC	0.0022UF 500V B	C727	CS0RCH4Q2J	CC	470 PF 50V CH	
C442	P4N8FJ472H	CMPP	0.0047UF 1.25KV	C728	E00NU2100M	CE	10 UF 16V	
C443	P4N8FJ392H	CMPP	0.0039UF 1.25KV	C729	CS0RB0414K	CC	0.01 UF 50V B	
C446	E02LU5220M	CE	22 UF 50V	C730	CS0RB0414K	CC	0.01 UF 50V B	
C448	E5EZFD220M	CE	22 UF 250V	C731	CS0RB0414K	CC	0.01 UF 50V B	
△ C501	P2472B224M	CMP	0.22UF 275V PHE840	C732	CS0RB0414K	CC	0.01 UF 50V B	
C502	CS0RF0316Z	CC	1 UF 25V F	C736	E50HU5010M	CE	1 UF 50V	
C503	E5EZT84R7M	CE	4.7 UF 100V	C737	E50HU5010M	CE	1 UF 50V	
C505	E52DHH151M	CE	150 UF 400V	or	C743	E50HU2100M	CE	10 UF 16V
	E52D0H151M	CE	150 UF 400V		C745	CS0RB02H5K	CC	0.22 UF 16V B
C506	C0JBB0713K	CC	0.001 UF 2KV B	C747	CS0RB02H5K	CC	0.22 UF 16V B	
C507	C0JBB0713K	CC	0.001 UF 2KV B	C748	E02LU1101M	CE	100 UF 10V	
△ C508	CD39E0MH3M	CC	0.0022UF 250V	C757	E02LU1101M	CE	100 UF 10V	
C509	E62NFB221M	CE	220 UF 160V	C758	CS0RCH412J	CC	100 PF 50V CH	
C511	E02LF2222M	CE	2200 UF 16V	C759	CS0RB0413K	CC	0.001 UF 50V B	
C512	C0JTB05Q2K	CC	470 PF 500V B	C760	E02LU1101M	CE	100 UF 10V	
C513	CS0RB0414K	CC	0.01 UF 50V B	C761	CS0RB0414K	CC	0.01 UF 50V B	
C515	E5EZF3102M	CE	1000 UF 25V	C762	CS0RB0413K	CC	0.001 UF 50V B	
C517	C0PLRR7U2K	CC	680 PF 2KV RR	C763	CS0RCH412J	CC	100 PF 50V CH	
C518	E02LU54R7M	CE	4.7 UF 50V	C764	CS0RCH4S1J	CC	56 PF 50V CH	
C522	E50HU2100M	CE	10 UF 16V	C801	C03L0R713K	CC	0.001 UF 2KV R	
C523	E02LU1221M	CE	220 UF 10V	C802	CS0RCH4K2J	CC	270 PF 50V CH	
△ C525	CD39E0M13M	CC	0.001 UF 250V	C803	CS0RCH4K2J	CC	270 PF 50V CH	
△ C526	P2472B104M	CC	0.1 UF 275V PHE840	C804	CS0RCH4K2J	CC	270 PF 50V CH	
△ C527	CD39E0M13M	CC	0.001 UF 250V	C901	E02LT0102M	CE	1000 UF 6.3V	
C528	E50HU2100M	CE	10 UF 16V	C902	CS0RB04E3K	CC	0.0015UF 50V B	
C530	CS0RB0315K	CC	0.1 UF 25V B	C903	CS0RCH4Q2J	CC	470 PF 50V CH	
C531	E5EZF4102M	CE	1000 UF 35V	C904	CS0RCH4H2J	CC	220 PF 50V CH	
C533	E02LU0221M	CE	220 UF 6.3V	C905	CS0RCH412J	CC	100 PF 50V CH	
C540	C0PLRR7G3K	CC	0.0018 UF 2KV RR	C906	CS0RCH412J	CC	100 PF 50V CH	
C541	CS0RB04H4K	CC	0.022 UF 50V B	C909	CS0RCH4Q2J	CC	470 PF 50V CH	
C542	E02LU3470M	CE	47 UF 25V	C910	CS0RB04E3K	CC	0.0015UF 50V B	
C543	CS0RB02L5K	CC	0.33 UF 16V B	C911	E50HU2100M	CE	10 UF 16V	
C601	CS0RCH4Q1J	CC	47 PF 50V CH	C912	CS0RB02L5K	CC	0.33 UF 16V B	
C602	E50HU50R1M	CE	0.1 UF 50 V	C913	CS0RCH430C	CC	3 PF 50V CH	
C603	CS0RF0316Z	CC	1 UF 25V F	C914	CS0RCH430C	CC	3 PF 50V CH	
C604	E50HU5010M	CE	1 UF 50V	C915	CS0RB02L5K	CC	0.33 UF 16V B	
C605	CS0RB0216K	CC	1 UF 16V B	C916	CS0RB02L5K	CC	0.33 UF 16V B	
C606	CS0RB0414K	CC	0.01 UF 50V B	C917	CS0RB02L5K	CC	0.33 UF 16V B	
C607	CS0RF0316Z	CC	1 UF 25V F	C918	CS0RCH4Q2J	CC	470 PF 50V CH	
C608	CS0RB0315K	CC	0.1 UF 25V B	C919	CS0RB04E3K	CC	0.0015UF 50V B	
C609	CS0RB0315K	CC	0.1 UF 25V B	C920	E50HU2100M	CE	10 UF 16V	
C611	E50HU53R3M	CE	3.3 UF 50V	C921	CS0RB0315K	CC	0.1 UF 25V B	
C612	CS0RB04E3K	CC	0.0015UF 50V B	C923	CS0RB02L5K	CC	0.33 UF 16V B	
C613	E02LU1471M	CE	470 UF 10V	C924	CS0RB02L5K	CC	0.33 UF 16V B	
C614	CS0RB0216K	CC	1 UF 16V B	C930	E50HU2220M	CE	22 UF 16 V	
C615	CS0RB0216K	CC	1 UF 16V B	C931	E50HU2220M	CE	22 UF 16 V	
C616	CS0RB04Q3K	CC	0.0047UF 50V B	C932	E50HU2220M	CE	22 UF 16 V	
C618	CS0RB0315K	CC	0.1 UF 25V B	C933	E50HU2220M	CE	22 UF 16 V	
C619	CS0RB0315K	CC	0.1 UF 25V B	C936	E50HU2100M	CE	10 UF 16V	
C620	CS0RB0315K	CC	0.1 UF 25V B	C937	E50HU2100M	CE	10 UF 16V	
C622	CS0RB0315K	CC	0.1 UF 25V B	C938	CS0RB0315K	CC	0.1 UF 25V B	
C623	CS0RB0315K	CC	0.1 UF 25V B	C939	E50HU53R3M	CE	3.3 UF 50V	
C624	E50HU2100M	CE	10 UF 16V	C941	CS0RB0315K	CC	0.1 UF 25V B	
C625	CS0RCH4Q1J	CC	47 PF 50V CH	C942	E50HU2100M	CE	10 UF 16V	
C628	E02LU2101M	CE	100 UF 16V	C944	CS0RCH4S1J	CC	56 PF 50V CH	
C629	CS0RB0413K	CC	0.001 UF 50V B	C945	CS0RCH4S1J	CC	56 PF 50V CH	
C630	CS0RCH4S1J	CC	56 PF 50V CH	C946	CS0RCH4S1J	CC	56 PF 50V CH	
C633	CS0RB0414K	CC	0.01 UF 50V B	C1002	E02LU0101M	CE	100 UF 6.3V	
C634	E62KT5100M	CE	10 UF 50V	C1007	CS0RB04Q3K	CC	0.0047UF 50V B	
C635	CS0RB03E5K	CC	0.15 UF 25V B	C1009	CS0RB04Q3K	CC	0.0047UF 50V B	
C636	CS0RB0315K	CC	0.1 UF 25V B	C1010	E50HU52R2M	CE	2.2 UF 50V	
C637	CS0RCH4S1J	CC	56 PF 50V CH	C1011	E50HU2330M	CE	33 UF 16 V	
C638	CS0RB0414K	CC	0.01 UF 50V B	C1012	E5EZF3222M	CE	2200 UF 25V	
C713	CS0RB0315K	CC	0.1 UF 25V B	C1013	E02LT2102M	CE	1000 UF 16V	
C714	CS0RB0414K	CC	0.01 UF 50V B	C1014	E02LT2102M	CE	1000 UF 16V	
C716	CS0RCH412J	CC	100 PF 50V CH	C1015	E62KT5470M	CE	47 UF 50V	
C717	E02LU1471M	CE	470 UF 10V	C1016	CS0RF0316Z	CC	1 UF 25V F	
C718	E02LU1471M	CE	470 UF 10V	C1018	E02LU0101M	CE	100 UF 6.3V	
C719	CS0RCH412J	CC	100 PF 50V CH	C1019	E02LU0221M	CE	220 UF 6.3V	
C720	CS0RCH4Q2J	CC	470 PF 50V CH	C1020	CS0RB0413K	CC	0.001 UF 50V B	
C721	CS0RCH412J	CC	100 PF 50V CH	C1021	CS0RB0413K	CC	0.001 UF 50V B	
C722	CS0RCH4Q2J	CC	470 PF 50V CH				DIODES	
C723	E50HU2100M	CE	10 UF 16V	D001	D97U03301B	DIODE,ZENER	MTZJ33B T-77	

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		REF. NO.	PART NO.	DESCRIPTION		
DIODES				TRANSISTORS				
D101	0021721150	LED	SLR-342VCT32	Q502	TNAAJ05003	COMPOUND TRANSISTOR	KRC111SRTK	
D102	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	Q503	TAAA1504SY	TRANSISTOR,SILICON	KTA1504S_Y_RTK	
D103	0021E5Q210	LED	LTL-1CHGE-002A	Q505	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT	
D108	D1VT001330	DIODE,SILICON	1SS133T-77	Q507	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)	
D401	D97U03001B	DIODE,ZENER	MTZJ30B T-77	Q508	TNAAJ05003	COMPOUND TRANSISTOR	KRC111SRTK	
D402	D97U03001B	DIODE,ZENER	MTZJ30B T-77	Q509	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA	
D403	D2WT011E10	DIODE,SILICON	11E1-EIC	Q510	TNAAC05002	COMPOUND TRANSISTOR	KRC103SRTK	
D404	D2WT011E10	DIODE,SILICON	11E1-EIC	Q511	TAAT01281Y	TRANSISTOR,SILICON	KTA1281_Y	
D405	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	Q512	TPAACB05001	COMPOUND TRANSISTOR	KRA102SRTK	
D406	D2WT011E10	DIODE,SILICON	11E1-EIC	Q513	TA3T1371A0	TRANSISTOR,SILICON	2SA1371(D,E)-AE	
D407	D2WT011E10	DIODE,SILICON	11E1-EIC	Q514	TC3T029090	TRANSISTOR,SILICON	2SC2909(S,T)-AA	
D408	D1VT001330	DIODE,SILICON	1SS133T-77	Q601	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
D410	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	Q602	TPAACB05001	COMPOUND TRANSISTOR	KRA102SRTK	
△ D501	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	Q603	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
△ D502	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	Q609	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
△ D503	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	Q701	TAATA12660	TRANSISTOR,SILICON	KTA1266-AT(Y,GR)	
△ D504	D2WTRM11C0	DIODE,SILICON	RM11C-EIC	Q702	TAATA12660	TRANSISTOR,SILICON	KTA1266-AT(Y,GR)	
D505	D2WT011E10	DIODE,SILICON	11E1-EIC	Q703	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
D506	D1VT001330	DIODE,SILICON	1SS133T-77	Q704	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
D507	D1VT001330	DIODE,SILICON	1SS133T-77	Q711	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
D508	D2WXN49370	DIODE,SILICON	1N4937	Q801	TCATC3199Y	TRANSISTOR,SILICON	KTC3199_Y-AT	
D511	D97U01501B	DIODE,ZENER	MTZJ15B T-77	Q802	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	
D512	D2WXS1400	DIODE,SCHOTTKY	SB140-EIC	Q803	TCATC3199Y	TRANSISTOR,SILICON	KTC3199_Y-AT	
D513	D2WXB290S0	DIODE,SILICON	SB290S	Q804	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	
D514	D1VT001330	DIODE,SILICON	1SS133T-77	Q805	TCATC3199Y	TRANSISTOR,SILICON	KTC3199_Y-AT	
D515	D2WXS1400	DIODE,SCHOTTKY	SB140-EIC	Q806	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	
D516	D2WXB290S0	DIODE,SILICON	SB290S	Q1001	TPAAC05002	COMPOUND TRANSISTOR	KRA103SRTK	
D517	D2WXN49370	DIODE,SILICON	1N4937	Q1003	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	
D519	D1VT001330	DIODE,SILICON	1SS133T-77	COILS & TRANSFORMERS				
D520	D28F30DF60	DIODE,RECTIFIER	30DF6-FC	L001	02167F100J	COIL	10 UH	
D521	D1VT001330	DIODE,SILICON	1SS133T-77	L101	02167F100J	COIL	10 UH	
D523	D2WT011E10	DIODE,SILICON	11E1-EIC	L102	02167F100J	COIL	10 UH	
D524	D2WT011E10	DIODE,SILICON	11E1-EIC	L202	033700005R	COIL,VIDEO IFT	3700005	
D525	D2WT011E10	DIODE,SILICON	11E1-EIC	L203	021LA62R2K	COIL	2.2 UH	
D526	D28F30DF60	DIODE,RECTIFIER	30DF6-FC	L204	021LA6100K	COIL	10 UH	
D527	D2WT011E10	DIODE,SILICON	11E1-EIC	L206	021LA6R27M	COIL	0.27 UH	
D528	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	L207	021LA6100J	COIL	10 UH	
D603	D1VT001330	DIODE,SILICON	1SS133T-77	L208	02167F3R3J	COIL	3.3 UH	
D604	D2WT011E10	DIODE,SILICON	11E1-EIC	L301	021LA62R2K	COIL	2.2 UH	
D606	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77	L303	021LA61R0M	COIL	1 UH	
D607	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77	L401	021679472K	COIL	4.7 MH	
D608	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77	L403	022100027A	COIL,LINEARITY	ELH5L4113	
D609	D1VT001330	DIODE,SILICON	1SS133T-77	△ L501	029T000091	COIL,LINE FILTER	0R8A393F28Y	
D610	D1VT001330	DIODE,SILICON	1SS133T-77	△ L503	028R200015	COIL,DEGAUSS	8R200015	
D611	D1VT001330	DIODE,SILICON	1SS133T-77	L601	02167F100J	COIL	10 UH	
D712	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	L701	021LA6220J	COIL	22 UH	
D723	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	L702	021LA6220J	COIL	22 UH	
D801	D1VT001330	DIODE,SILICON	1SS133T-77	L703	021LA6220J	COIL	22 UH	
D802	D1VT001330	DIODE,SILICON	1SS133T-77	L704	021LA6220J	COIL	22 UH	
D803	D1VT001330	DIODE,SILICON	1SS133T-77	L705	021LA6220J	COIL	22 UH	
D1001	D1VT001330	DIODE,SILICON	1SS133T-77	L706	021LA6220J	COIL	22 UH	
D1002	D1VT001330	DIODE,SILICON	1SS133T-77	L707	021LA6220J	COIL	22 UH	
D1003	D1VT001330	DIODE,SILICON	1SS133T-77	L708	021LA6220J	COIL	22 UH	
ICS				L709	021LA6220J	COIL	22 UH	
IC101	I5PD0F006A	IC	OECF006A	L710	021LA6220J	COIL	22 UH	
IC102	IC7J0311A0	IC	R3111N311A/C-TR	L711	021LA6220J	COIL	22 UH	
IC199	A3L902G015	IC	S-24C04BDP-LA	L712	021LA6220J	COIL	22 UH	
IC201	I0WDE2248C	IC	STV2248C	L713	02167F100J	COIL	10 UH	
IC401	I0WTD81740	IC	TDA8174A	L715	021LA6220J	COIL	22 UH	
IC501	I0WD015070	IC	TEA1507P/N1	L716	021LA6220J	COIL	22 UH	
IC502	I1KA98R09A	IC	KIA78R09API	or	L801	02167F101J	COIL	100 UH
△ IC503	I0GA909RD0	IC	PQ09RD08	L802	02167D151K	COIL	150 UH	
△ IC506	I1KA98R060	IC	KIA278R06PI	L803	02167D151K	COIL	150 UH	
IC702	0002E00610	PHOTO COUPLER	LTV-817M-VB	L804	02167D151K	COIL	150 UH	
IC702	I0QS02234L	IC	NJM2234L	L904	02167F100J	COIL	10 UH	
IC902	I19FF34100	IC	MSP3410G-QA-B8	L905	02167F100J	COIL	10 UH	
IC1002	IC03SP46000	IC	LA4600	T401	03305Y0018	TRANS,HORIZONTAL DRIVE	305Y001	
TRANSISTORS				△ T501	0481400674	TRANSFORMER,SWITCHING	81400674	
JACKS								
Q102	TAAA1504SY	TRANSISTOR,SILICON	KTA1504S_Y_RTK	J701	063G100041	SOCKET,21PIN	035_0_8083_00	
Q103	TAAA1504SY	TRANSISTOR,SILICON	KTA1504S_Y_RTK	J702	060J131015	HEADPHONE JACK	MSJ-2000	
Q201	T8AA03881S	TRANSISTOR,SILICON	KTC3881S-RTK	J703	060G401047	RCA JACK	HTJ-032-03AY	
Q202	TCAA3875SY	TRANSISTOR,SILICON	KTC3875S_Y_RTK	J704	060G401046	RCA JACK	HTJ-032-03AW	
Q301	T8AA03881S	TRANSISTOR,SILICON	KTC3881S-RTK	J705	060G401039	RCA JACK	HTJ-032-03AR	
△ Q401	TDUF024990	TRANSISTOR,SILICON	2SD2499	△ J801	066C130017	SOCKET,CRT	CVT3275-5101	
Q402	TCAT032070	TRANSISTOR,SILICON	KTC3207-AT	SW102	0504201T31	SWITCH,TACT	SKHVBED010	
△ Q501	T41F026510	TRANSISTOR FIELD EFFECT	2SK2651-01MR					

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION		
SWITCHES				
SW104	0504201T31	SWITCH,TACT	SKHVBED010	
SW106	0504201T31	SWITCH,TACT	SKHVBED010	
SW107	0504201T31	SWITCH,TACT	SKHVBED010	
△ SW501	0530205016	SWITCH	SDKVA30100	
VARIABLE RESISTORS				
VR401	V1K6213BT8	VOLUME,SEMI FIXED	NVG6THTB102	
VR420	V1K62Q2BT8	VOLUME,SEMI FIXED	NVG6THTB471	
VR501	V116313BTC	VOLUME,SEMI FIXED	EVNCYAA03B13	
P.C.BOARD ASSEMBLIES				
PCB010	A3L902G010K	PCB ASS'Y	TMA528C	
PCB110	A3L902G110K	PCB ASS'Y	TCA387C	
PCB290	A3L902G290K	PCB ASS'Y	TEAA89A	
MISCELLANEOUS				
B501	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
B504	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
B701	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
B702	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
B901	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
B902	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
BT001	1412004013	BATTERY,MANGAN	R03(AB)2PXBPI	
BT002	1412004013	BATTERY,MANGAN	R03(AB)2PXBPI	
△ CD501	1206655823	CORD,AC BUSH	1206655823	
CD801	1278210014	BRAIDED WIRE	SM1642-001	
CD802	WCL6840038	FLAT CABLE AWM2468 AWG26 5C GRAY 400MM		
CD803	WBL6034038	FLAT CABLE AWM2468 AWG26 4C BLACK 340MM		
CF201	1012T5R507	FILTER,CERAMIC TRAP	TPWA02B-TF21	
CF202	1022T38R9A	FILTER,SAW	SAF38.9MAZ220Z	
CF204	1012T04001	FILTER,CERAMIC TRAP	MKT40.4MA110P-TF	
CF301	1022133R41	FILTER,SAW	SAFGM33M4VC0Z00B03	
CF303	1012T03101	FILTER CERAMIC TRAP	MKT31.9MA110P-TF	
CP001	069D01001A	CONNECTOR PCB SIDE	003P-2100	
CP101	069X160379	CONNECTOR PCB SIDE	06JQ-ST	
CP401	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P	
CP501	069S320419	CONNECTOR PCB SIDE	A3963WV2-3PD	
CP502	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P	
CP601	069W010030	CONNECTOR PCB SIDE	TBS-X01X-A1	
CP801	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P	
CP901	069J1A0048	CONNECTOR PCB SIDE	IMSA-9130S-10L	
CP902	069J1A0048	CONNECTOR PCB SIDE	IMSA-9130S-10L	
CP1001	069S140419	CONNECTOR PCB SIDE	A2502WV2-4P	
CP802A	067U005049	WIRE HOLDER	B2013H02-5P	
CP802B	067U005049	WIRE HOLDER	B2013H02-5P	
CP803A	067U004029	WIRE HOLDER	B2013H02-4P	
CP803B	067U004029	WIRE HOLDER	B2013H02-4P	
CP901A	069J1A0038	CONNECTOR PCB SIDE	IMSA-9130B-10	
CP902A	069J1A0038	CONNECTOR PCB SIDE	IMSA-9130B-10	
EL001	124116281A	EYE LET	XRY16X28BD	
EL002	124120301A	EYE LET	XRY20X30BD	
△ F501	080NT04004	FUSE	50T040H	
△ FB401	043221012F	TRANSFORMER,FLYBACK	3221012F	
FH501	06710T0006	HOLDER,FUSE	EYF-52BC	
FH502	06710T0006	HOLDER,FUSE	EYF-52BC	
ICP501	0845T07003	IC PROTECTOR	20P_7000	or
	083PC07002	MICRO FUSE	251007	
ICP502	0845T03003	IC PROTECTOR	20P_3000	
OS101	0773071001	REMOTE RECEIVER	RPM7138-H5	
△ RY501	0560V20115	RELAY	ALKS321	
SP351	070C555006	SPEAKER	SG05A02AWA	
△ TH501	D8E080A100	DEGAUSS ELEMENT	B59209-J80-A10	
TM101	076R0EY010	TRANSMITTER	R25-1788	
TU001	0145517006	TUNER,VHF-UHF	TUWRF4EG-778F2	
△ V801	098A210440	CRT W/DY	A51EER33X74	
X101	100CT4R013	CRYSTAL	HC-49/U-S	
X601	100CT4R408	CRYSTAL	HC-49/U	
X602	100CT3R509	CRYSTAL	HC-49/U	
X901	100CT01803	CRYSTAL	HC-49/U-S	

RESISTOR	
RC.....	CARBON RESISTOR
CAPACITORS	
CC.....	CERAMIC CAPACITOR
CE.....	ALUMI ELECTROLYTIC CAPACITOR
CP.....	POLYESTER CAPACITOR
CPP.....	POLYPROPYLENE CAPACITOR
CPL.....	PLASTIC CAPACITOR
CMP.....	METAL POLYESTER CAPACITOR
CMPL.....	METAL PLASTIC CAPACITOR
CMPP.....	METAL POLYPROPYLENE CAPACITOR

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